ORDER NO. SD81041873C8

Service Manual

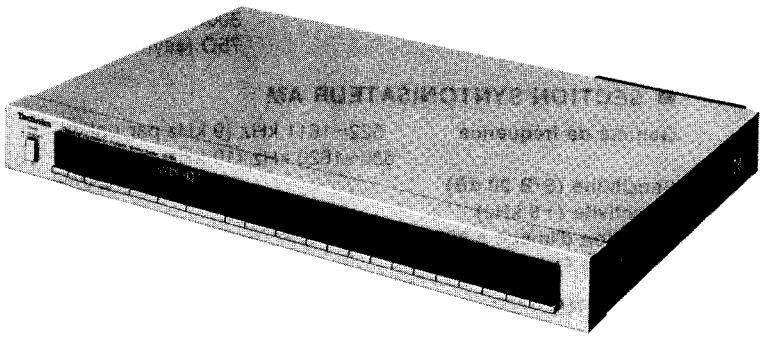
QUARTZ Synthesizer FM/AM Stereo Tuner

ST-S4

[E], [EG], [EH], [XA], [XL]

ST-S4 (K)

[E], [EG], [EH], [EA], [XA], [XL]



Areas

* [E] is available in Switzerland and Scandinavia.
* [EG] is available in F.R. Germany.
* [EH] is available in Holland .
* [EA] is available in Austria.
* [XA] is available in East South Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

*** The cabinet and front panel are available in black color and silver types.**
*** The black type model is provided with (K) in the Service Manual.**

English

Specifications

(Specifications are subject to change without notice for further improvement.)

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50~108.02 MHz
Sensitivity	2.0 μV (IHF, usable)
S/N 30 dB	2.0 μV (300Ω), 1.0 μV (75Ω)
S/N 26 dB	1.8 μV (300Ω), 0.9 μV (75Ω)
S/N 20 dB	1.6 μV (300Ω), 0.8 μV (75Ω)
IHF 46 dB stereo quieting sensitivity	24.5 μV/75Ω
Total harmonic distortion	
MONO (normal)	0.08%
STEREO (normal)	0.1%
S/N	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (73 dB, IHF)
Frequency response	20 Hz~15 kHz, +0.5 dB~ −1.5 dB
Alternate channel selectivity	
normal ±400 kHz	60 dB
super narrow ±200 kHz	22 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	70 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	90 dB
AM suppression	55 dB
Stereo separation	
1 kHz	50 dB
10 kHz	40 dB
Carrier leak	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.0 dB
Limiting point	1.9 μV
Bandwidth	
IF amplifier (normal)	180 kHz
FM demodulator (normal)	1000 kHz
Antenna terminals	300Ω (balanced)
	75Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	522~1611 kHz (9 kHz-step)
	530~1620 kHz (10 kHz-step)
Sensitivity (S/N 20 dB)	30 μV, 250 μV/m
Selectivity (±9 kHz)	55 dB
Image rejection at 999 kHz	45 dB
IF rejection at 999 kHz	40 dB

■ GENERAL

Output voltage	0.3V (0.6V, IHF)
Power consumption	8W
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 53 × 300 mm
	(16-15/16" × 2-3/32" × 11-13/16")
Weight	3.2 kg
	(7 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Deutsch

TECHNISCHE DATEN

(Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

(DIN 45 500)

■ SECTION SYNTONISATEUR FM

Gamme de fréquence	87,50~108,02 MHz
Sensibilité	2,0 μV (IHF utilisable)
S/B 30 dB	2,0 μV (300Ω), 1,0 μV (75Ω)
S/B 26 dB	1,8 μV (300Ω), 0,9 μV (75Ω)
S/B 20 dB	1,6 μV (300Ω), 0,8 μV (75Ω)
Sensibilité stéréo au seuil de 46 dB, IHF	24,5 μV/75Ω
Distorsion harmonique totale	
MONO (normal)	0,08%
STEREO (normal)	0,1%
Signal/Bruit	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (73 dB, IHF)
Réponse de fréquence	20 Hz~15 kHz, +0,5 dB~ −1,5 dB
Sélectivité alternée par canal	
normal ±400 kHz	60 dB
super narrow ±200 kHz	22 dB
Taux de capture	1,0 dB
Rejection d'image à 98 MHz	70 dB
Rejection FI à 98 MHz	90 dB
Rejection de réponse parasite à 98 MHz	90 dB
Suppression AM	55 dB
Séparation stéréophonique	
1 kHz	50 dB
10 kHz	40 dB
Fuite de porteuse	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Equilibrage de canaux (250 Hz~6,300 Hz)	±1,0 dB
Point de limite	1,9 μV
Largeur de bande	
Amplificateur FI (normal)	180 kHz
Démodulateur FM (normal)	1000 kHz
Bornes d'antenne	300Ω (symétrique) 75Ω (asymétrique)

■ SECTION SYNTONISATEUR AM

Gamme de fréquence	522~1611 kHz (9 kHz par palier) 530~1620 kHz (10 kHz par palier)
Sensibilité (S/B 20 dB)	30 μV, 250 μV/m
Sélectivité (±9 kHz)	55 dB
Réjection d'image à 999 kHz	45 dB
Réjection FI à 999 kHz	40 dB

■ DIVERS

Tension de sortie	0,3 V (0,6V, IHF)
Consommation	8W
Alimentation	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr)	430 × 53 × 300 mm
Poids	3,2 kg

Remarque:
On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).

Français

CARACTERSTIQUES

(Sujet á changement sans préaris.)

(DIN 45 500)

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,02 MHz
Eingangsempfindlichkeit	1,0 μV (nutzbar nach IHF) (Nur für Deutshland bestimmt) 2,0 μV (nutzbar nach IHF) (Für andere Länder)
S/R 30 dB	1,0 μV (75 Ω) (Nur für Deutshland bestimmt)
S/R 26 dB	0,9 μV (75 Ω) (Nur für Deutshland bestimmt)
S/R 20 dB	0,8 μV (75 Ω) (Nur für Deutshland bestimmt)
S/R 30 dB	2,0 μV (300 Ω), 1,0 μV (75 Ω) (Für andere Länder)
S/R 26 dB	1,8 μV (300 Ω), 0,9 μV (75 Ω) (Für andere Länder)
S/R 20 dB	1,6 μV (300 Ω), 0,8 μV (75 Ω) (Für andere Länder)
Stereoumschaltschwelle bei 46 dB nach IHF	24,5 μV/75 Ω
Gesamtklirrfaktor	
Mono (normal)	0,08%
Stereo (normal)	0,1%
Geräuschabstand	
Mono	70 dB (78 dB nach IHF)
Stereo	65 dB (73 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+0,5 dB ~ −1,5 dB)
Trennschärfe bei Störsender	
normal ±400 kHz	60 dB
super narrow ±200 kHz	22 dB
Einfangverhältnis	1,0 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	70 dB
ZF-Dämpfung bei 98 MHz	90 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	90 dB
AM-Unterdrückung	55 dB
Übersprechdämpfung	
1 kHz	50 dB
10 kHz	40 dB
Trägerrest	
19 kHz	−30 dB (−35 dB nach IHF)
38 kHz	−45 dB (−50 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,0 dB
Begrenzereinsatz	1,9 μV
Bandbreite	
ZF-Verstärker (normal)	180 kHz
UKW-Demodulator (normal)	1000 kHz
Antennenanschluß	
	75 Ω (unsymmetrisch) (Nur für Deutshland bestimmt) 300 Ω (symmetrisch) (Für andere Länder) 75 Ω (unsymmetrisch) (Für andere Länder)

■ AM-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz (9-kHz-Shritte) 530~1620 kHz (10-kHz Schritte)
Eingangsempfindlichkeit (S/R 20 dB)	30 μV, 250 μV/m
Trennschärfe (±9 kHz)	55 dB
Spiegelfrequenz-Dämpfung bei 999 kHz	45 dB
ZF-Dämpfung bei 999 kHz	40 dB

■ ALLGEMEINE DATEN

Ausgangsspannung	0,3 V (0,6 V, IHF)
Leistungsaufnahme	8W
Netzspannung	
	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Abmessungen (B×H×T)	430 × 53 × 300 mm
Gewicht	3,2 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rausch-spektrometer (Anlage H.P. 3045) gemessen.

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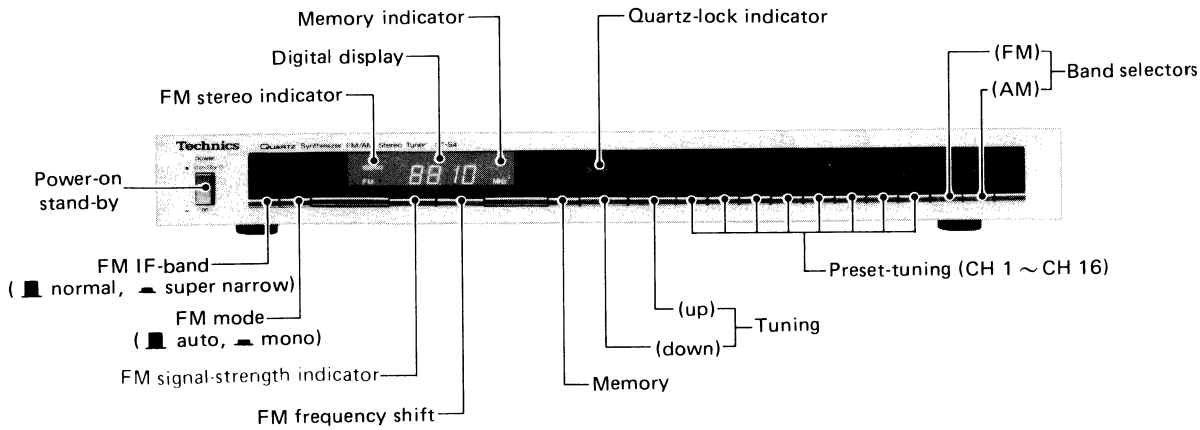
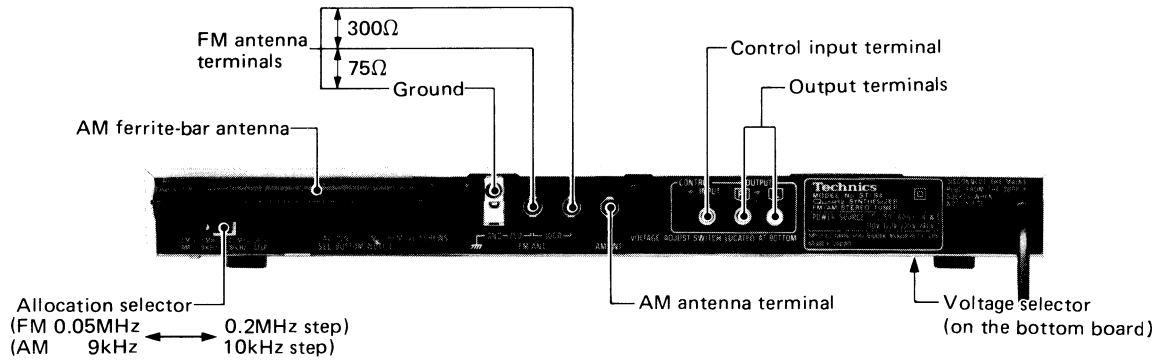
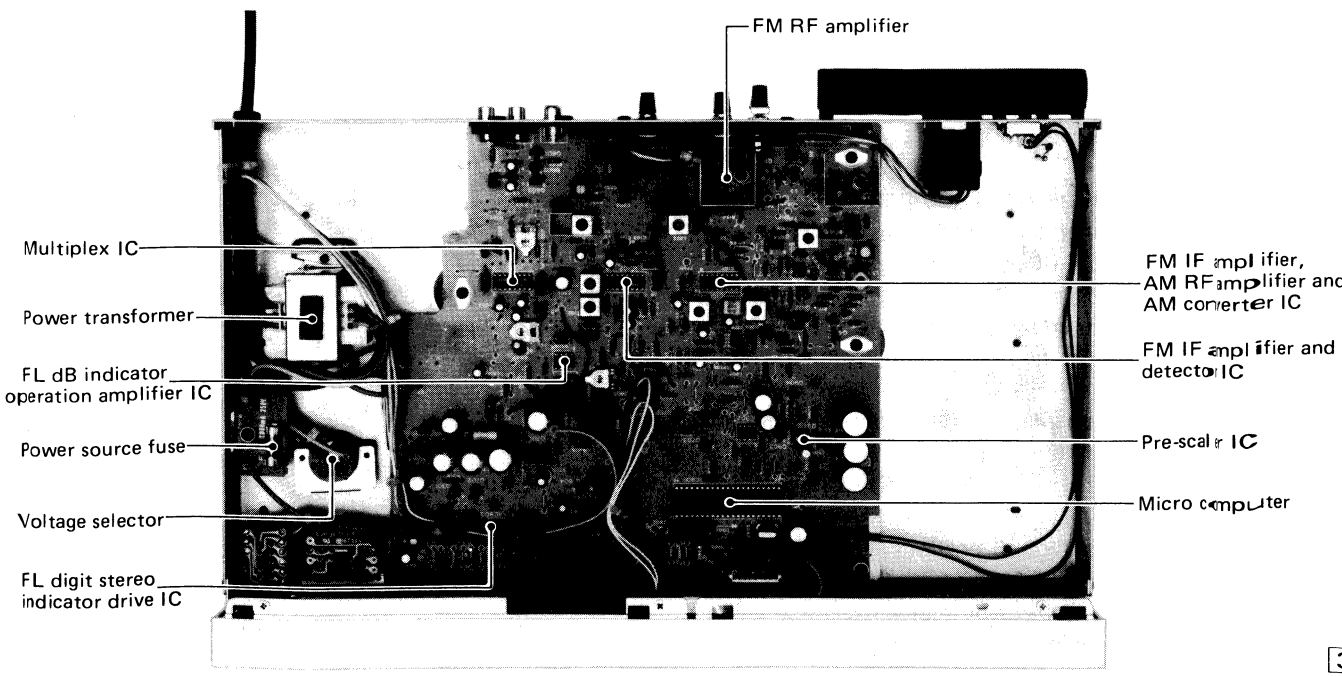
■ LOCATION OF CONTROLS



- **The products for destinations [XA] and [XL] are not equipped with FM frequency-shift switch**



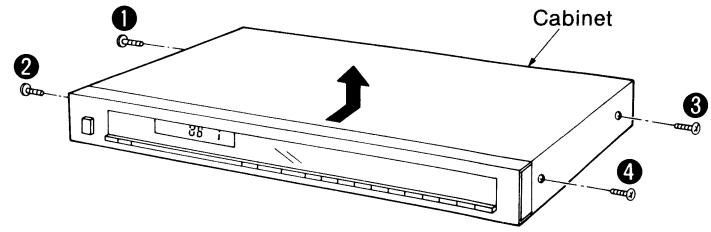
- **FM Antenna**
  Note that the FM antenna terminals used on products for F.R. Germany [EG] are the 75Ω Type only


FM RF amplifier
Multiplex IC
Power transformer
FL dB indicator operation amplifier IC
Power source fuse
Voltage selector
FL digit stereo indicator drive IC
FM IF amplifier, AM RF amplifier and AM converter IC
FM IF amplifier and detector IC
Pre-scaler IC
Micro computer

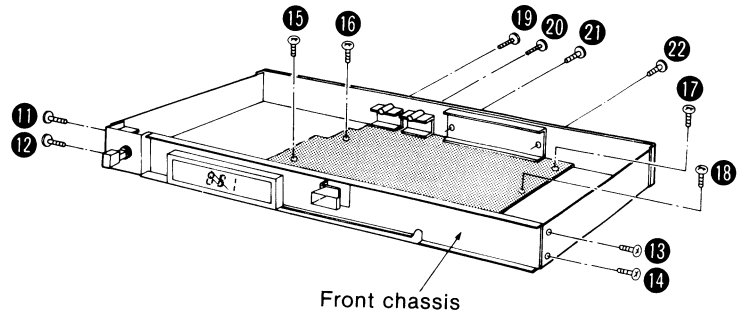
■ DISASSEMBLY INSTRUCTIONS

• How to check the printed circuit board

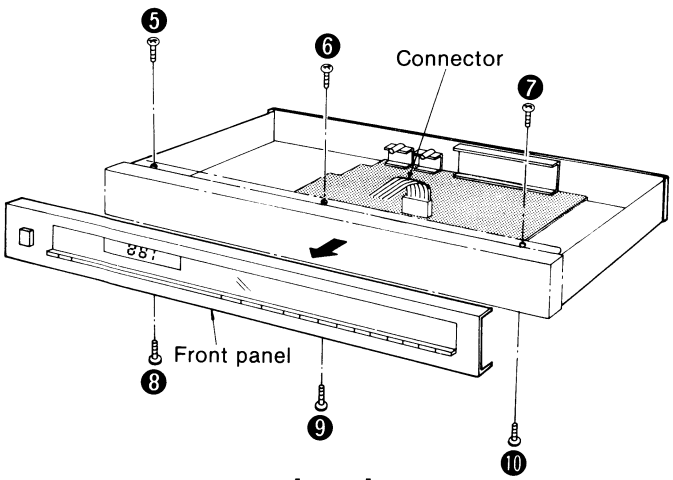
1. Remove the 4 setscrews (Fig. 1 : ❶ ~ ❹) on the side of the cabinet.
2. Remove the 1 connector (Fig. 2) on the printed circuit board.
3. Remove the 6 setscrews (Fig. 2 : ❺ ~ ❿) of the front panel.
4. Remove the front panel.
5. Remove the 4 setscrews (Fig. 3 : ⓫ ~ ⓮) on the side of the chassis.
6. Remove the 4 setscrews (Fig. 3 : ⓯ ~ ⓲) of the printed circuit.
7. Remove the 4 setscrews (Fig. 3 : ⓳ ~ ㉒) of the antenna and output terminal plate.
8. Remove the front chassis with printed circuit board. (Fig. 4)



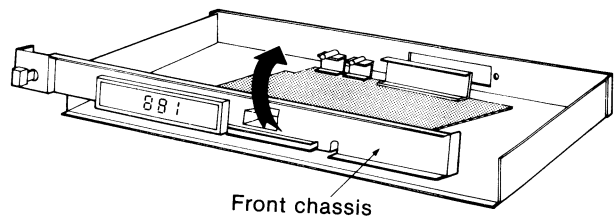
[Fig. 1]



[Fig. 3]



[Fig. 2]



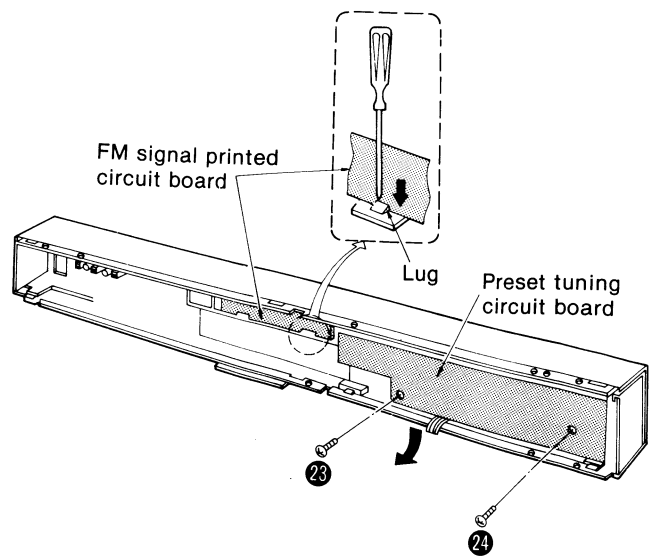
[Fig. 4]

• How to remove the preset tuning printed circuit board

1. Remove the cabinet and front panel (Refer to the procedures 1 to 4 of "How to check the printed circuit board").
2. Remove the FM signal printed circuit board. (Fig. 5)
3. Remove the 2 setscrews (Fig. 5 : ㉓, ㉔) of the preset tuning circuit board.
4. Remove the printed circuit board.

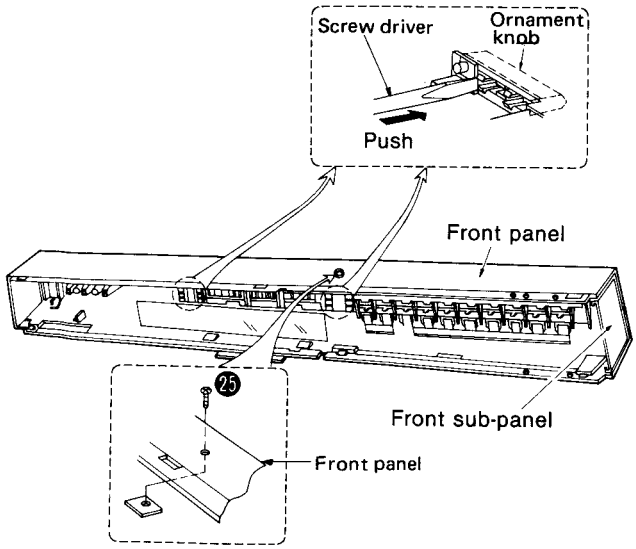
• How to remove the front sub-panel

1. Remove the cabinet and front panel (Refer to the procedures 1 to 4 of "How to check the printed circuit board").
2. Remove the preset tuning printed circuit board (Refer to "How to remove the preset tuning printed circuit board").
3. Push the two ornamental knobs to remove them from the front sub-panel. (See Fig. 6)
4. Remove the 1 setscrew (Fig. 6 : ㉕) of the front panel.
5. The Lugs projected (at 6 portions) from the front sub-panel are engaged with the front panel. Disengage the claws from by screwdriver or the like to remove the front sub-panel. (See Fig. 7)

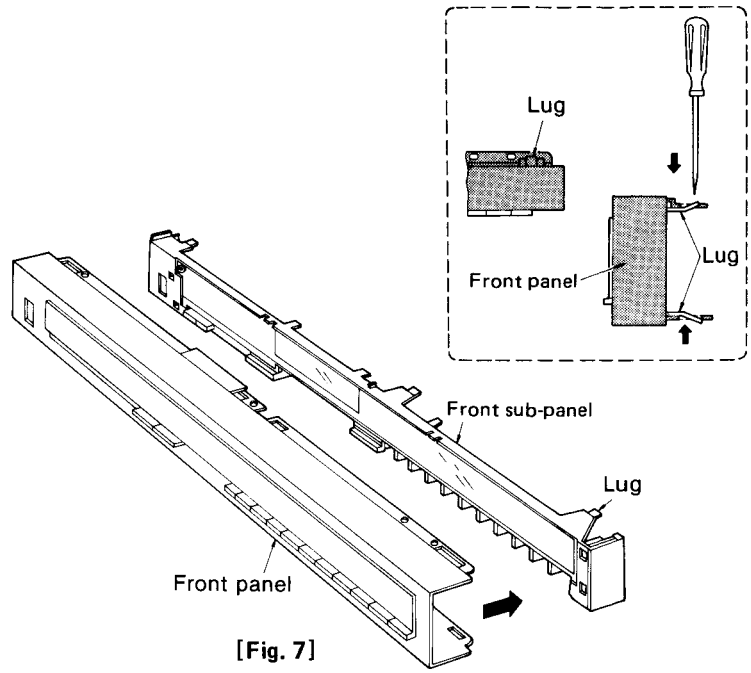


[Fig. 5]

Note: When mounting the ornamental knob, install the front sub-panel on the front panel, and then insert the knobs and secure them with board.

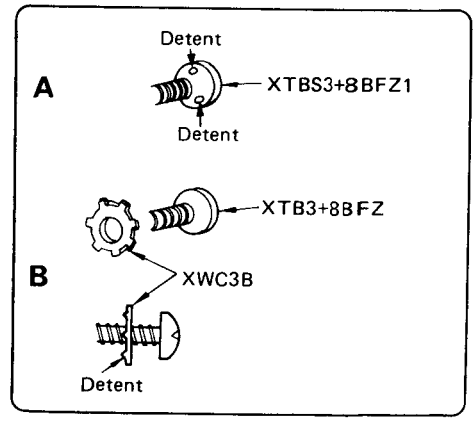


[Fig. 6]



[Fig. 7]

Note 1: Setscrews ⓯ to ⓲ are screws with detents (Part No. : XTBS3+8BFZ1) as shown in Fig. 8-A in order to make the contact of electric circuit perfect.
Take care not to mix up these screw with other screws. When substituting, use a 3 x 8mm tapping screw (Part No. : XTB3+8BFZ) and toothed lock washer (Part No. : XWC3B) as shown in Fig. 8-B. The teeth of the lock washer should be positioned on the chassis side.



[Fig. 8]

■ MEASUREMENTS AND ADJUSTMENTS English

Notes: 1. Coil (L301) has been already adjusted, and require no adjustment.
2. The allocation switch position varies with different destinations.
Be sure to shift the allocation switch position to "AM 9kHz/FM 0.05MHz" before making the adjustment.

AM ADJUSTMENT

• Setting and Equipment used
1. AC and DC electronic voltmeters (VTVM)
2. AM signal generator (AM-SG)
3. Maintain line voltage at rated voltage.
4. Output of signal generator should be no higher than necessary to obtain an output reading.
5. Pull the AM ferrite-bar antenna (L201) outward.
6. Set input selector to "AM" position.
7. Use a non-metal screwdriver for the adjustment.
8. Set FM mode switch to "auto" position.

Step No.	AM SIGNAL GENERATOR		DISPLAY FREQUENCY BY PRESET	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	CONNECTION	FREQUENCY				
	AM-IF ADJUSTMENT					
1	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Powerful input)	450kHz (30% Mod. with 400Hz)	Frequency of non-interference	Connect to AC VTVM or scope to "OUTPUT" terminals of the set.	T201 (1st IFT) T202 (2nd IFT)	• Adjust the input frequency and adjustment points so that the output becomes maximum.

Step No.	AM SIGNAL GENERATOR CONNECTION	AM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY BY PRESET	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	AM-RF ADJUSTMENT					
2	Connect AM-SG to AM antenna terminal through 200pF capacitor. Common to chassis. (Weak input)	522kHz (30% Mod. with 400Hz)	522kHz	Connect DC VTVM to TP201 terminal.	L202 (OSC Coil)	Adjust L202 to 1.0V±0.05V.
3		612kHz (30% Mod. with 400Hz)	612kHz	Connect AC VTVM or scope to "OUTPUT" terminals of the set.	L201 (ANT Coil)	1. Adjust for maximum output. 2. Adjust ferrite core of L201 by screw driver.
4		1503kHz (30% Mod. with 400Hz)	1503kHz	Connect AC VTVM or scope to "OUTPUT" terminals of the set.	CT201 (ANT Trimmer)	1. Adjust for maximum output 2. Repeat steps (3) and (4) until the frequency correctly matches the dial display.

FM ADJUSTMENT

• Equipment used
1. FM signal generator (FM-SG)
2. Stereo modulator (or separation meter)
3. Distortion analyser
4. Oscilloscope
5. AC and DC electronic voltmeters (VTVM)
6. Frequency counter (19kHz and 108MHz measurable)
7. FM 300Ω dummy antenna (Fig. 9)

• Preparation of FM signal generator (FM-SG)
1. Connect stereo modulator to FM-SG.
2. Apply SG output to antenna terminal of the set through 300Ω FM dummy antenna.
3. The standard input of the set is 60dB (1mV), 400Hz 100% modulation (Because of using dummy antenna, SG output must be 12dB plus (1HF). That is, when input is 60dB, SG output is to be 72dB.)

• Setting
1. Set FM mode switch to "auto" position.
2. FM IF -band switch to "normal" position.
3. Set input selector to "FM" position.
4. Other setting are the same as in AM adjustment.

	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY BY PRESET	INDICATOR	ADJUSTMENT POINTS	REMARKS
	FM-IF ADJUSTMENT					
5	———	No-Signal	Frequency of non-interference	Connect DC VTVM between TP102 and TP103 through choke coil (Refer to Fig. 11)	T101 (Discri. IFT)	Adjust T101 core so that voltage measured in signal mode is 0V in 300mV range.
	FM RF ADJUSTMENT					
6	———	No-Signal	87.50MHz	Connect DC VTVM to TP1 terminal	L5 (OSC Coil)	Adjust L5 (OSC Coil) to 3±0.1V.
7	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	90.00MHz (100% Mod. with 400Hz) weak input	90.00MHz	Connect scope to "OUTPUT" terminals of the set.	L1 (ANT Coil) L2 (RF DET Coil, 1st) L4 (RF DET Coil, 2nd) T1 (FM IFT)	1. Add weak input so that noise is included in the output wave form. 2. Make the adjustment so that the output wave form is vertically symmetrical. Refer to Fig. 12. 3. Repeat the steps (7) and (8) until the frequency correctly matches the dial display.
8		106.00MHz (100% Mod. with 400Hz)	106.00MHz	Connect scope to "OUTPUT" terminals of the set	CT1 (OSC Trimmer)	
	FM MONO DISTORTION ADJUSTMENT					
9	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	100.00MHz (100% Mod. with 400Hz)	100.00MHz	Connect distortion analyser to "OUTPUT" terminals of the set.	T102 (Discri. IFT)	1. Set the FM mode switch to "auto" and then check step (5) in no signal mode. 2. If it is deflected, readjust of T101. 3. Adjust T102 core so that distortion of right and left channels are minimized.
	FM dB INDICATOR ADJUSTMENT					
10	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna.	100.00MHz (100% Mod. with 400Hz)	100.00MHz	———	VR501	1. Apply 100.00MHz, 400Hz 100% modulated 62dB signal to antenna terminal 2. Push the FM signal level indicator button switch, and adjust VR501 so that 56dB displayed. 3. Decrease the input down to 30dB and then slowly increase up to 62dB. 4. Make sure that the display is then 56dB. If 56dB is not displayed, re-adjust it.

Step No.	FM SIGNAL GENERATOR CONNECTION	FM SIGNAL GENERATOR FREQUENCY	DISPLAY FREQUENCY BY PRESET	INDICATOR	ADJUSTMENT POINTS	REMARKS
	FM MPX PILOT (VCO) ADJUSTMENT					
11	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Monaural signal)	100.00MHz (Non-modulated)	100.00MHz	Connect frequency counter to TP301 through resistor (100kΩ)	VR301 (VCO)	1. Set the FM mode switch to "auto" position. 2. Adjust VR301 to 19kHz±30Hz.
	STEREO DISTORTION ADJUSTMENT					
12	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Pilot 10% Mod. stereo signal)	100.00MHz (100% Mod. with 400Hz) (L mode)	100.00MHz	Connect distortion analyser to "OUTPUT" terminals of the set through low-pass filter. (fc =15kHz ~ 19kHz)	T1 (IFT)	1. Set the FM mode switch to "auto" position. 2. Re-adjust the already adjusted T1 within ±90° from the preset core position so that the distortion of Lch is minimized.
	SEPARATION ADJUSTMENT					
13	Connect FM-SG to FM antenna terminal through 300Ω FM dummy antenna. (Pilot 10% Mod. stereo signal)	100.00MHz **100.1MHz** (100% Mod. with 1kHz) (L or R mode)	100.00MHz **(100.1MHz)**	Connect AC VTVM to "OUTPUT" terminals of the set through low-pass filter. (fc=15kHz ~ 19kHz)	VR302 (Separation)	1. Set the FM mode switch to "auto" position. 2. Adjust VR302 so that R output is minimized when stereo modulator is in L (Lch modulation) mode and that L output is minimized in R mode.

■ EINSTELLUNGSANWEISUNGEN ■ Deutsch ■

Anmerkung: **1. Die Spule (L301) ist bereits justiert worden und bedarf keiner weiteren Justierung.**
2. Die Position des Wellenverteilungs-Wahlschalters ist je nach dem Bestimmungsort verschieden. Vor dem Vornehmen von Justierungen, den Wellenverteilungs-Wahlschalter unbedingt in die Position "AM 9kHz/FM 0,05MHz" umstellen.

AM (MW)-EINSTELLUNG

• Stellungen und zu benutzende Geräte
1. Elektronische Voltmeter für Wechsel-und Gleichstrom (VTVM)
2. AM (MW)-Meßsender (AM-SG)
3. Netzspannung auf ihren Sollwerthalten.
4. Der Ausgang der Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute Ablesung.
5. Die AM-Ferritstabantenne (L201) herausziehen.
6. Den Eingangswähler auf die "AM"-Position stellen.
7. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.
8. UKW-Betriebsartenschalter Schalter.....avto

Nr.	AM (MW)-MESSENDER ANSCHLUSS	AM (MW)-MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHSVERF AHREN
	AM (MW)-ZF-ABGLEICH					
1	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Anten-neneingang verbinden. Die gemeinsame Leitung mit dem Chassis verbinden. (Starker Eingang)	450kHz (400Hz Modulat , 30%)	Kein Empfang	Oszilloskop oder Wech-selstrom-Voltmeter an Ausgangsklemme (OUT-PUT) Schließen.	T201 (1. 1FT) T202 (2. 1FT)	Die Eingangsfrequenz und die Einstellungspunkte so adustie-ren, daß der Ausgang den maximadlen Wert erreicht.
	AM (MW)-HF-ABGLEICH					
2	Einen MW-Signal-generator über einen 200pF Kondensator mit dem MW-Anten-neneingang verbinden Die gemeinsame Leitung mit dem Chassis verbinden. (Schwacher Eingang)	522kHz (400Hz Modulat., 30%)	522kHz	Zwischen TP201 und Erdung Gleichstrom-Voltmeter schließen.	L202 (Osc. Spule)	L202 so justieren, daß die vom Gleichstrom-Voltmeter gemessene.
3		612kHz (400Hz Modulat., 30%)	612kHz	Oszilloskop oder Wech-selstrom-Voltmeter an Ausgangsklemme (OUT-PUT) Schließen.	L201 (Ant. Spule)	1. Auf max. Ausgang abgleichen 2. Den Ferritkern von L201 mit einem Schraubendreher justieren.
4		1503kHz (400Hz Modulat., 30%)	1503kHz	Oszilloskop oder Wech-selstrom-Voltmeter an Ausgangsklemme (OUT-PUT) Schließen.	CT201 (Ant. Trimmer)	1. Auf max. Ausgang abgleichen 2. Die Schritte (3) und (4) wied-erholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

- Verwendete Einrichtungen
1. UKW-Meßsender (FM-SG)
2. Stereo-Modulator (oder Trennmesser)
3. Verzerrungsmesser
4. Oszilloskop
5. Elektronische Voltmeter für Wechsel-und Gleichstrom (VTVM)
6. Signalfrequenzmesser (meßber für 19 kHz und 108 MHz)
7. UKW 75 Ohm Kunstantenne (Abb. 2) und Tiefpaßfilter (fc=15 ~ 19 kHz)

• Vorbereitung AM UKW-Messender (FM-SG)
1. Stereo-Modulator an FM-SG anschließen.
2. GS-Ausgang über 75-Ohm UKW Kunstantenne an den Antennen-eingang des Gerätes schließen.
3. Der normale Eingang des Gerätes beträt 60 dB (1 mV), 400 Hz 100% Modulation. (Wegen Verwendung der Kunstantenne muß der Signalausgang 12 dB plus (IHF) sein: d.h. beim Eingang von 60 dB soll der Signalausgang 72 dB sein.)

• Zustand des Gerätes
1. Den UKW-Betriebsartenschalter auf die "auto"-Stellung bringen
2. Den UKW-ZF Bandbreitenschalter auf die "normal"-Stellung bringen.
3. Den Eingangswähler auf die "FM"-Position stellen.
4. Die anderen Einstellungen entsprechen den AM (MW)-Einstellungen.

Nr.	FM (UKW) MESSENDER ANSCHLUSS	FM (UKW) MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHSVERF AHREN
	UKW-ZF-ABGLEICH					
5	———	Kein Signal	Kein Empfang	Ein Gleichstromrören-voltmeter zwischen TP102 und TP103 über eine Drosselspule verbinden (Siehe Abb. 3)	T101 (Diskriminator FT)	Den Kern von T101 so justieren, daß die gemessene Spannung im signallosen Modus 0V im 300mV Bereich beträgt.
	UKW-HF-ABGLEICH					
6	———	Kein Signal	87.50MHz	Zwischen TP1 und Erdung Gleichstrom-Voltmeter schließen.	L5 (Osc. Spule)	L5 so justieren, daß die vom Gleichstrom-Voltmeter gemessene Spannung 3±0.1V beträgt.
7	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	90.00MHz (400Hz Modulat., 100%)	90.00MHz	Oszilloskop an Ausgangsklemme (OUTPUT) Schließen.	L1 (Ant. Spule) L2 (HF Det. Spule 1) L4 (HF Det. Spule 2) T1 (IFT)	1. Einen schwachen Eingang geben, bei dem Geräusch in der Ausgangswellenform enthalten wird. 2. So einstellen, daß die Ausgangswellenform vertikal symmetrisch wird. (Abb. 4) 3. Die Einstellung von (6), (7) und (8) wiederhoten, bis die Frequenz mit der Skala übereinstimmt.
8		106.00MHz (400Hz Modulat., 100%)	106.00MHz	Oszillosk op an Ausgangsklemme (OUTPUT) Schließen.	CT1 (Osc. Trimmer)	
	ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO					
9	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen	100.00MHz (400Hz Modulat., 100%)	100.00MHz	Verzerrungsmesser an rechten und linken Kanäle Ausgangsklemme "OUTPUT" des Gerätes schließen.	T102 (Diskriminator FT)	1. Den UKW-Betriebsarten-schalter auf "auto" einstellen Schritt (5) im signallosen Zustand prüfen. 2. Wenn Abweichung vorliegt (primäre Seite) von T102 wieder einstellen. 3. T102 Kern für minimale Verzerrung der rechten und linken Kanäle justieren.
	UKW-SIGNALPEGELTASTE-ABGLEICH					
10	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	100.00MHz (400Hz Modulat., 100%)	100.00MHz	———	VR501	1. Ein Signal von 100.00MHz, 400Hz 100% moduliert 62dB an den Antennen-anschluß anlegen. 2. Den UKW-Signalpegelanze-iger-Tastenschalter drücken und VR501 so justieren, daß 56dB angezeigt wird. 3. Die Eingangsleistung auf 30dB reduzieren und dann langsam auf 62dB erhöhen. 4. Überprüfen, daß dann 56dB angezeigt wird. Falls der Anzeigewert nicht 56dB beträgt, erneut justieren.
	UKW-MPX-PILOTABGLEICH (VCO)					
11	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen. (Mono-Signal)	100.00MHz (Un-modulierte Welle)	100.00MHz	Zähler über einen Widerstand 100kΩ on TP301 schließen.	VR301 (VCO)	1. Den UKW-Betriebsarten-schalter auf "auto" einstellen. 2. VR301 so abgleichen, daß Ausgangsfrequenz von TP301 19kHz ± 30Hz.

Nr.	FM (UKW) MESSENDER ANSCHLUSS	FM (UKW) MESSENDER FREQUENZ	ANZEIGE-FREQUENZ DURCH VOR-EINSTELLUNG	VORBEREITUNG	ABGLEICHSPUNKTE	ABGLEICHSVERF AHREN
	STEREO-VERZERRUNGSABGLEICH					
12	Meßsender über eine Kunstantenne an den UKW-Antennen-eingang schließen. (Stereo-Pilotsignal 10% moduliert.)	100.00MHz (400Hz Modulat., 100%) L Betriebsart	100.00MHz	Tiefpaßfilter (fc = 15 ~ 19kHz) über verzerrungsmesser an Ausgangsklemme (OUTPUT) des Gerätes schließen.	T1 (IFT)	1. Den UKW-Betriebsarten-schalter auf "auto" einstellen. 2. Den schon eingestellten T1 erneut, innerhalb von ± 90° von der voreingestellten Kernposition einstellen, sodaß die Verzerung des linken Kanals minimalisiert wird.
	TRENNUNG-ABGLEICH					
13	Meßsender über eine Kunstantenne an den UKW-Antennen-eingang schließen. (Stereo-Pilotsignal 10% moduliert.)	100.00MHz (400Hz Modulat., 100%) L- oder R-Betriebsart.)	100.00MHz	Tiefpaßfilter (fc=15 ~ 19kHz) über Wechselstrom-voltmeter an Ausg-angklemme (OUT-PUT) des Gerätes schließen.	VR302	1. Den UKW-Betriebsarten-schalter auf "auto" einstellen. 2. VR302 auf minimale Anzeige des R-Ausgangs bei Stereomodulator in L (L-Kanalmodulation) Modus, und auf minimale Anzeige des L-Ausgangs in R-Modus abgleichen.

■ INSTRUCTIONS DE REGLAGE Français

Notes: **1. La bobine (L301) a déjà été mise au point et ne nécessite plus de réglage.**
2. La position du commutateur d'attribution diffère selon les différentes destinations.
S'assurer de décaler la position du commutateur d'attribution sur "AM 9kHz/FM 0,05MHz"

REGLAGE DE AM

• Réglage et équipement utillsé
1. Voltmètres électronique de courant alternatif et de courant continu (VTVM)
2. Générateur du signal AM (AM-SG)
3. Conservel la tension du secteur à la tension nominale.
4. Le signal du générateur ne doit pas étre plus élevé qu'il n'est nécessaire à obtenir une lecture en sortie.
5. Retirer lántenne á tige de ferrite (L201) de la modulation d'amplitude.
6. Sélecteur d'entrée sur la position "AM"
7. Utiliser un tournevis non-métallique pour le réglage.
8. Sélecteur de mode FM . . . . . auto

No.	AM GENERATEUR BRANCHEMENT	AM GENERATEUR FREQUENCE	FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	REGLAGE DE FI-AM					
1	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis. (Entrée sous puissante)	450kHz (modulé à 30% par 400Hz)	Point sans signal	Brancher le voltmètre à courant alternatif et l'oscilloscope aux borne de sortie (OUTPUT) de l'appareil.	T201 (1 transfo FI) T202 (2 transfo FI)	Régler la fréquence d'entrée et les points de réglage de telle sorte que la sortie devienne maximale.
	REGLAGE DE RF-AM					
2	Brancher le AM-SG à la borne de l'antenne AM par un condensateur de 200pF. Commun au châssis. (Entrée faible)	522kHz (modulé à 30% par 400Hz)	522kHz	Brancher le voltmètre à courant continu entre TP201 et la prise de terre.	L202 (Bobine OSC)	Régler L202 de telle sorte que le voltage mesuré par le volt-mètre à courant continu , soit de 1.0 ± 0.05V.
3		612kHz (modulé à 30% par 400Hz)	612kHz	Brancher le voltmètre à courant alternatif et l'oscilloscope aux borne de sortie (OUTPUT) de l'appareil.	L201 (Bobine Ant.)	1. Régler au maximum de signal de sortie. 2. Régler le noyau ferrite de L201 à l'aide d'un tournevis.
4		1503kHz (modulé à 30% par 400Hz)	1503kHz	Brancher le voltmètre à courant alternatif et l'oscilloscope aux borne de sortie (OUTPUT) de l'appareil.	CT201 (Trimmer Ant.)	1. Régler au maximum de signal de sortie. 2. Refaire les étapes (3) et (4) jusqu'à ce que le fréquence s'aligne correctement avec l'affichage du cadran.

REGLAGE DE FM

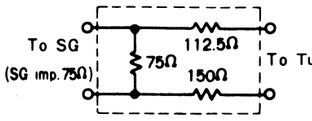
• Equipment utilisé
1. Générateur du signal FM (FM-SG)
2. Commande de réglage stéréophonique (ou vu-mètre de séparation).
3. Jauge de distorsion.
4. Oscilloscope.
5. Voltmètres électronique de courant alternatif et de courant continu (VTVM).
6. Compteur de fréquence (19kHz et 108MHz mesurable).
7. Antenne fictive FM, 300 ohms (Fig. 9) et filtre passe-bas (fc= 15 ~ 19kHz)

• Préparation du générateur de signal FM (FM-SG)
1. Brancher la commande de réglage stéréophonique à FM-SG.
2. Alimenter la sortie SG à la borne de l'antenne de l'appareil, par l'antenne fictive FM, 300 ohms.
3. L'entrée standard de l'appareil est de 60dB (1mV), 400Hz, 100% de modulation (à cause de l'utilisation de l'antenne fictive, la sortie SG doit être de plus 12dB (IHF). Ce qui signifie que quand l'entrée est de 60dB, la sortie SG doit être de 72dB.)

• Conditions de l'appareil
1. Placer le sélecteur de mode FM sur la position "auto".
2. Placer le interrupteur de gamme FM-IF sur la position "normal".
3. Sélecteur d'entrée sur la position "FM"
4. Les autres réglages sont les mêmes que les réglages de AM.

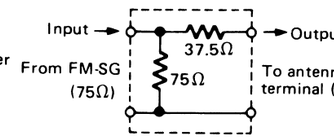
Nr.	FM GENERATEUR		FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	BRANCHEMENT	FREQUENCE				
	REGLAGE DE FI-FM					
5	————	Sans Signal	Point sans signal	Brancher le voltmétre électronique á c.c. aux bornes TP102 et TP103 (Voir la Fig. 11)	T101 (Transfo FI discri.)	Régler le noyau T101 de telle sorte que le voltage mesuré dans le mode sans signal, soti de 0V dans la gamme des 300mV.
	REGLAGE DE RF-FM					
6	————	Sans Signal	87.50MHz	Brancher le voltmètre à courant continu entre TP1 et la prise de terre.	L5 (Bobin Osc.)	Régler L5 de telle sorte que le voltage mesuré par le voltmètre à courant continu soit de 3 ± 0.1V.
7	Branchez sur la prise d'antenne FM à traves une antenne fictive FM	90.00MHz (modulé à 100% par 400Hz)	90.00MHz	Brancher le voltmètre à courant alternatif et l'oscilloscope aux borne de sortie (OUTPUT) de l'appareil.	L3 (1er détecteur) L4 (2e détecteur) L1 (Bobin Ant.) T101 (Transfo FI)	1. Appliquer une entrée faible de telle sorte que le parasite soit compris dans la forme de l'onde de sortie. 2. Faire le réglage de telle sorte que la forme de l'onde de sortie soit verticalement symétrique. (Voir fig. 12) 3. Refaire les réglages (6), (7) et (8) jusqu'à ce que la fréquence corresponde correctement avec l'échells du cadran.
8		106.00MHz (modulé à 100% par 400Hz)	106.00MHz	Brancher le voltmètre à courant alternatif et l'oscilloscope aux borne de sortie (OUTPUT) de l'appareil.	CT1 (Trimmer Osc.)	
	REGLAGE DE LA DISTORSION FM EN MONO					
9	Branchez sur la prise d'antenne FM à travers une antenne fictive FM	100.00MHz (modulé à 100% par 400Hz)	100.00MHz	Brancher le compteur de distorsion à la borne de sortie (OUTPUT) du canal gauche et droit de l'appareil.	T102 (Transfo FI discri.)	1. Placer le sélecteur de mode FM sur la position "auto" et vérifier l'étape (5) dans le mode sans signal. 2. S'il est déplacé, re-fégler (côté primaire) de T101. 3. Régler le noyou T102 de telle sorte que la distorsion des canaux droit et gauche soit la plus faible.
	REGLAGE DE INDICATEUR D'INTENSITE DES SIGNAUX FM					
10	Branchez sur la prise d'antenne FM á travers une antenne fictive FM	100.00MNz (modulé à 100% par 400Hz)	100.00MHz	————	VR501	1. Appliquer un signal de 62dB modulé à 100% 400Hz, 100,00MHz à la borne d'antenne. 2. Appuyer sur le commutateur à touche de l'indicateur de niveau de transmission FM, et régler VR501 de façon à ce que 56dB soit affiché. 3. Diminuer l'entrée à 30dB, puis augmenter lentement jusqu'à 62dB. 4. S'assurer que l'affichage soit alors de 56dB. Si 56dB n'est pas affiché, l'ajuster à nouveau.
	REGLAGE (VCO) PILOTE MULTIPLEX FM					
11	Branchez sur la prise d'antenne FM à travers une antenne fictive FM. (Signal monoscous-tique)	100.00MHz Non modulé	100.00MHz	Branchez le fréquence-mètre sur TP301 à travers une résistance de 100kΩ	VR301	1. Placer le sélecteur de mode FM sur la position "auto" 2. Régler VR301 de telle sorte que la fréquence de sortie de TP301 soit de 19kHz ± 30Hz.

No.	FM GENERATEUR		FREQUENCE D'AFFICHAGE PAR PREREGLAGE	PREPARATIONS	ELEMENTS REGLES	PROCEDURE DE REGLAGE
	BRANCHEMENT	FREQUENCE				
	REGLAGE DE LA DISTORSION STEREO					
12	Branchez sur la prise d'antenne FM à travers une antenne fictive FM. (Signal stéréo pilote à 10% de modulation)	100.00MHz (modulé à 100% par 400Hz) (Mode G)	100.00MHz	Brancher le filter passe-bas (fc=15 ~ 19kHz) à la borne de sortie (OUTPUT) de l'appareil par un compteur de distorsion.	T1	1. Placer le sèlecteur de mode FM sur la position "auto". 2. Rerégler le T1 déjà réglé, à ± 90% de la position préréglée du noyau de telle sorte que la distorsion du canal gauche soit minimale.
	REGLAGE DE LA SEPARATION DES CANAUX					
13	Branchez sur la prise d'antenne FM à travers une antenne fictive FM (Signal stéréo pilote à 10% de modulation)	100.00MHz (modulé à 100% par 400Hz) (Mode G ou D.)	100.00MHz	Brancher le filter passe-bas (fc=15 ~ 19kHz) à la borne de sortie (OUTPUT) de l'appareil par un voltmètre à courant alternatif.	VR302	1. Placer le sèlecteur de mode FM sur la position "auto". 2. Régler VR302 de telle sorte que la sortie droite soit minimale quand la commande d'accord stéréophonique est dans le mode gauche (modulation du canal gauche) et que la sortie gauche soit minimale dans mode droit.



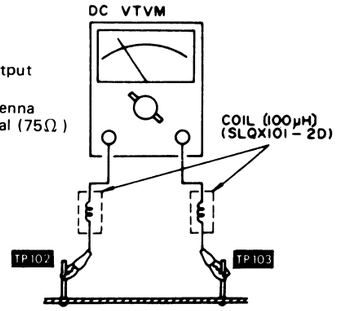
300Ω FM Dummy Antenna

[Fig. 9]
Abb. 1

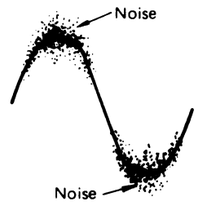


(75Ω FM dummy antenna)

[Fig. 10]
Abb. 2



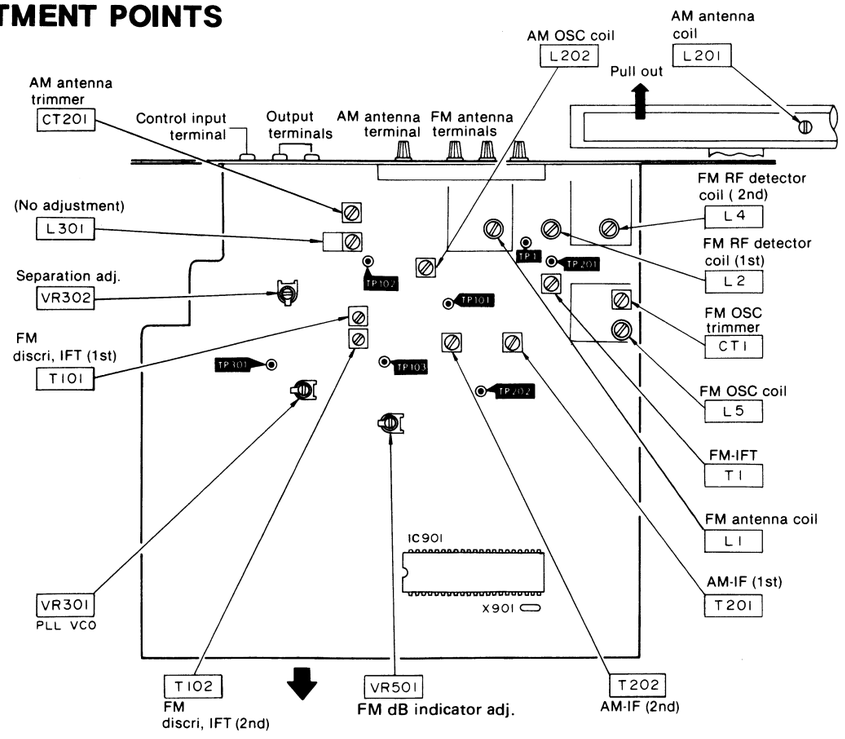
[Fig. 11]
Abb. 3



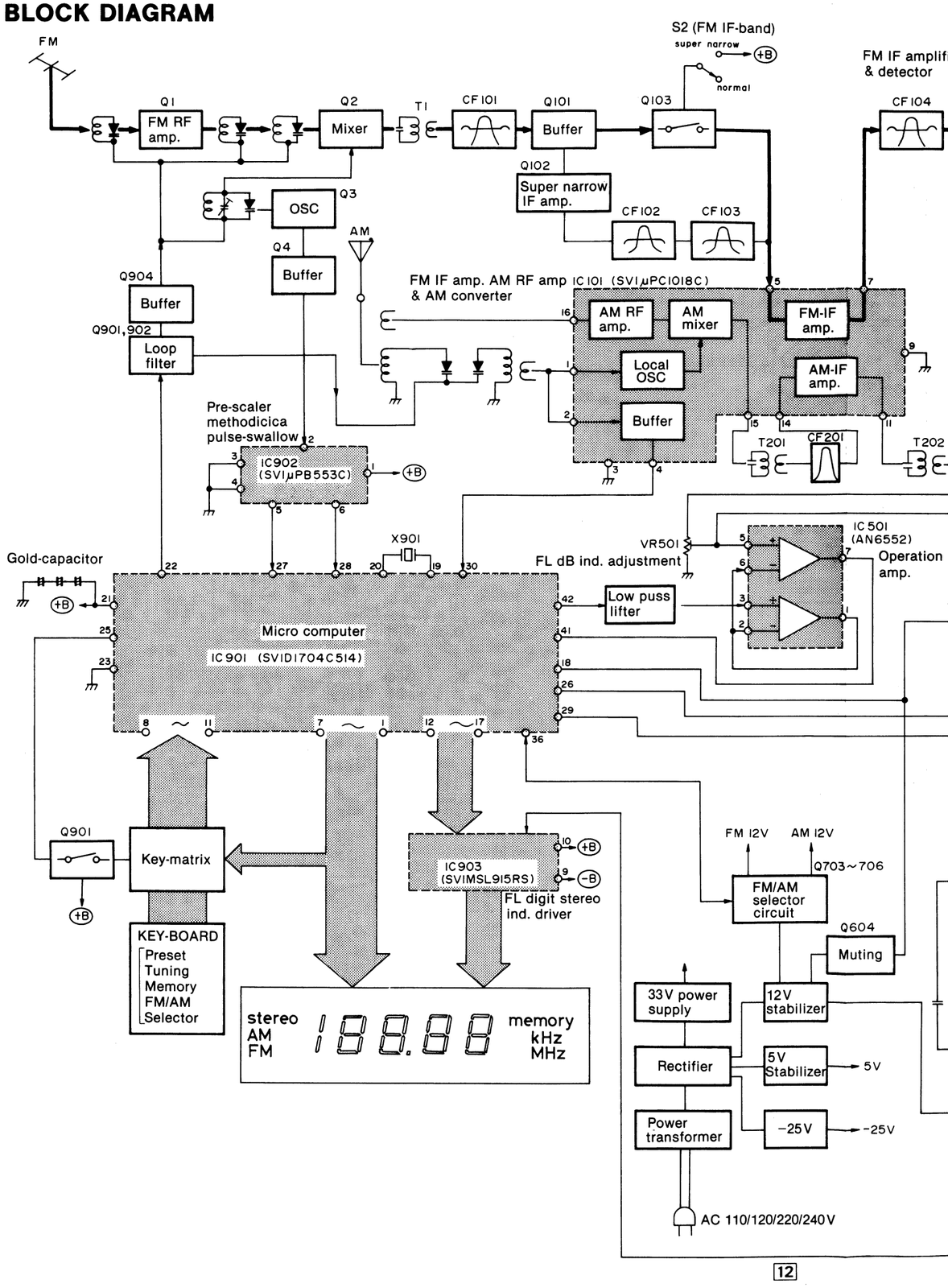
AF output wave form

[Fig. 12]
Abb. 4

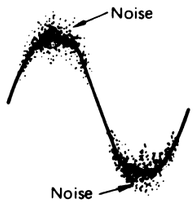
■ ADJUSTMENT POINTS



■ BLOCK DIAGRAM



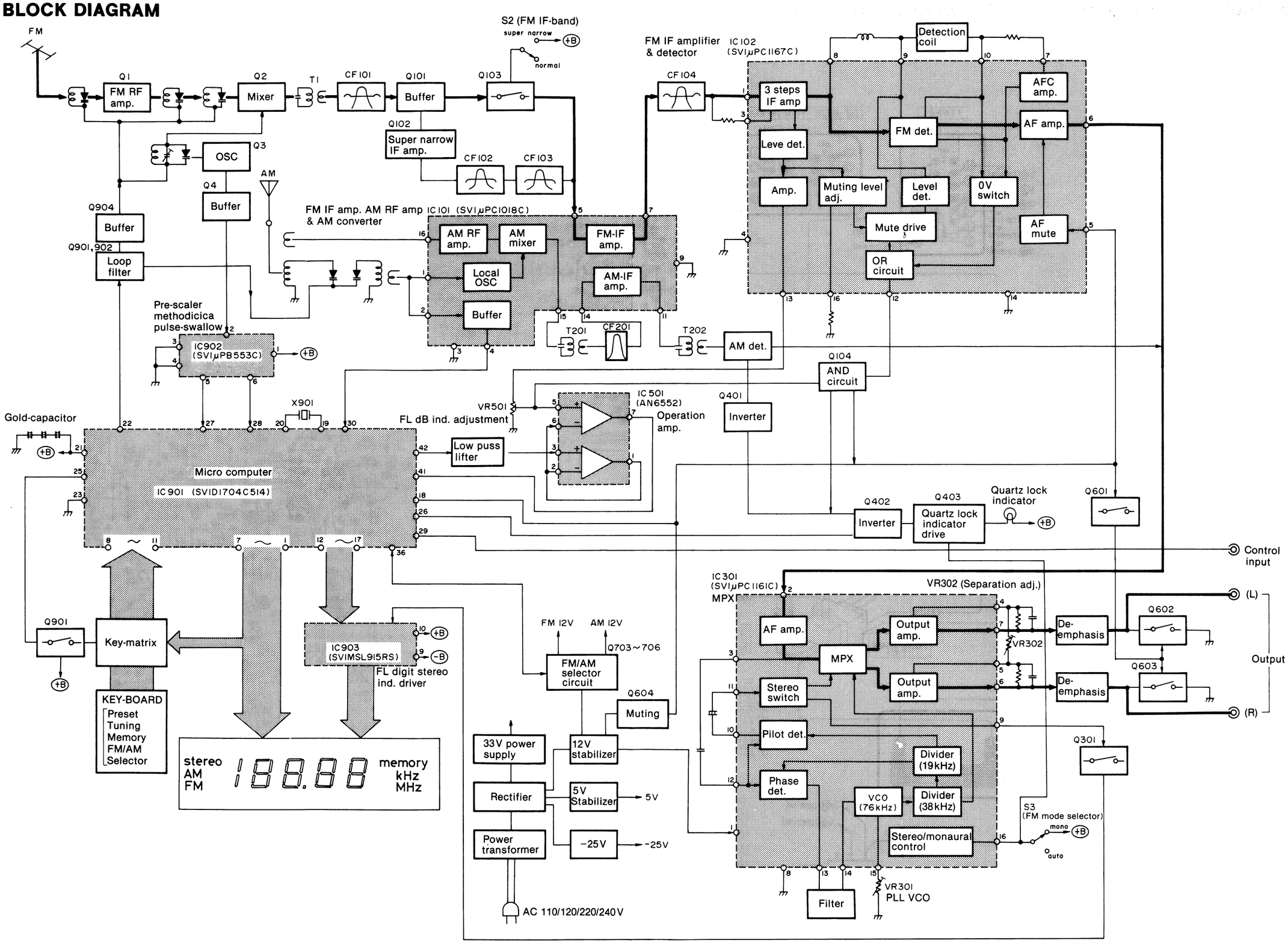
CEDURE DE REGLAGE
cer le sèlecteur de mode sur la position "auto". égler le T1 déjà réglé, 90% de la position réglée du noyau de telle te que la distorsion du al gauche soit minimale.
cer le sèlecteur de mode sur la position "auto". gler VR302 de telle sorte e la sortie droite soit mini- le quand la commande ccord stéréophonique est s le mode gauche (modula- n du canal gauche) et que ortie gauche soit minimale s mode droit.



AF output wave form

[Fig. 12]
Abb. 4

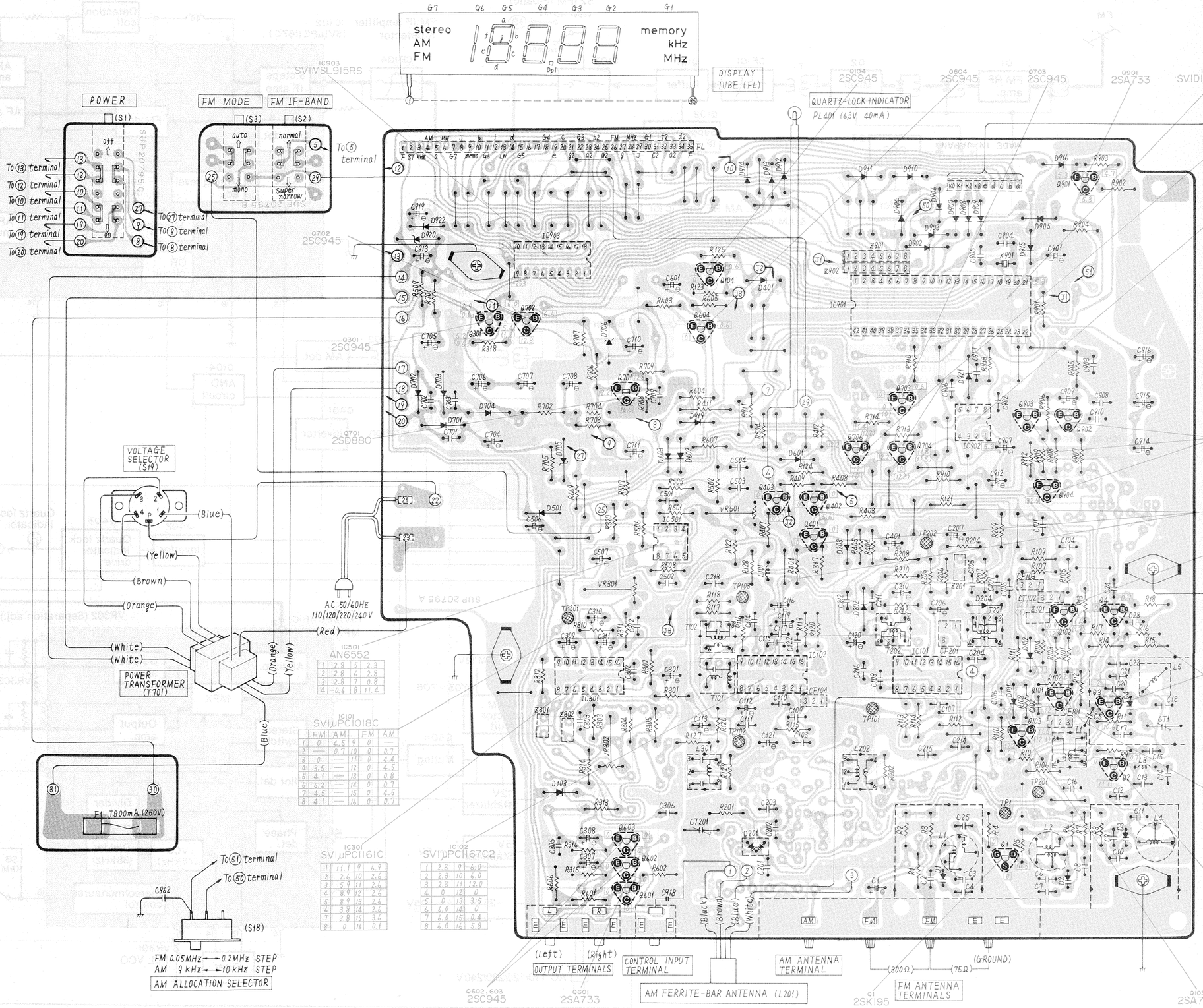
■ BLOCK DIAGRAM



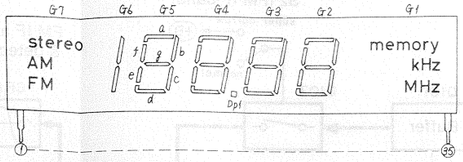
ST-S4
ST-S4

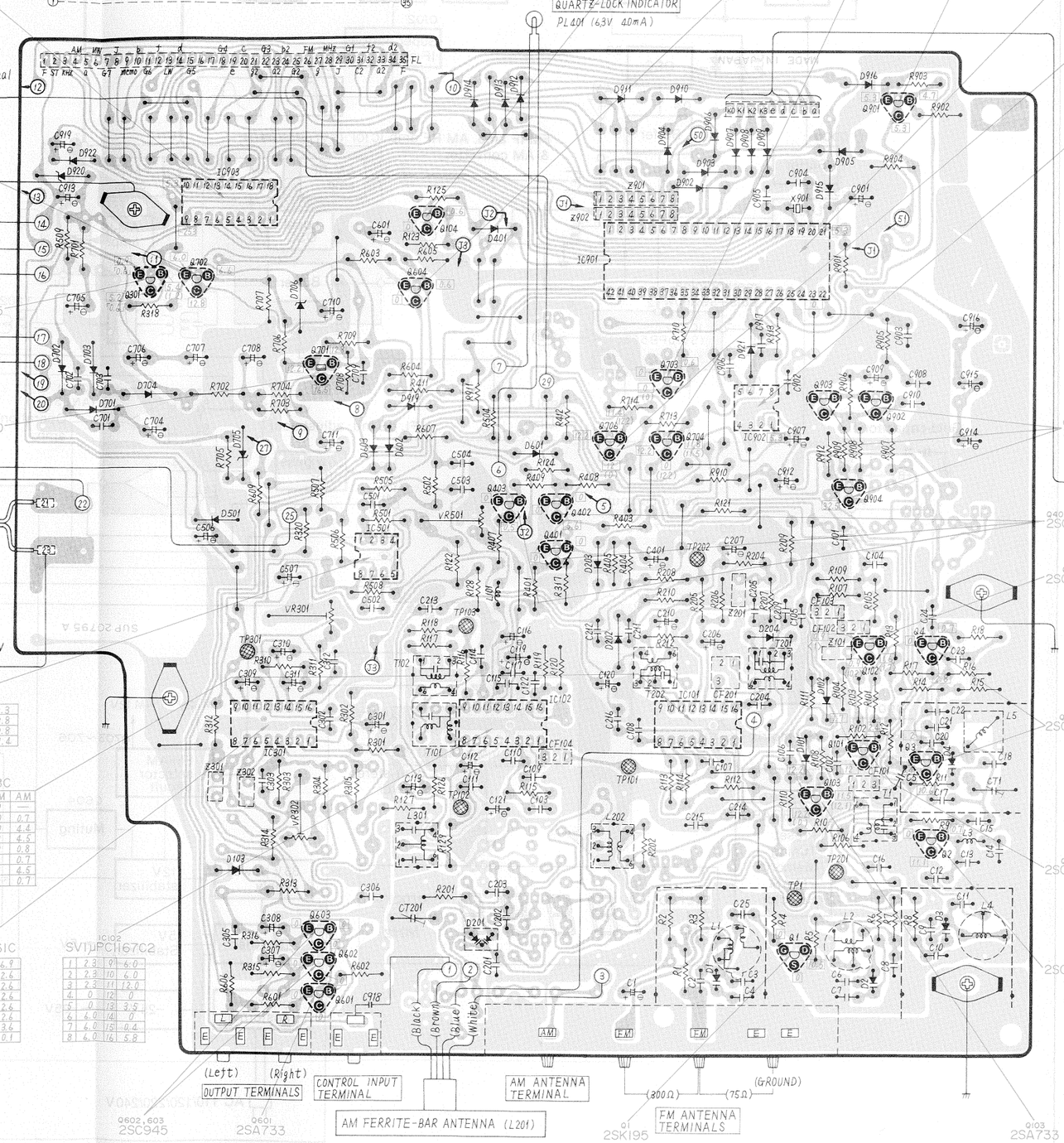
■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

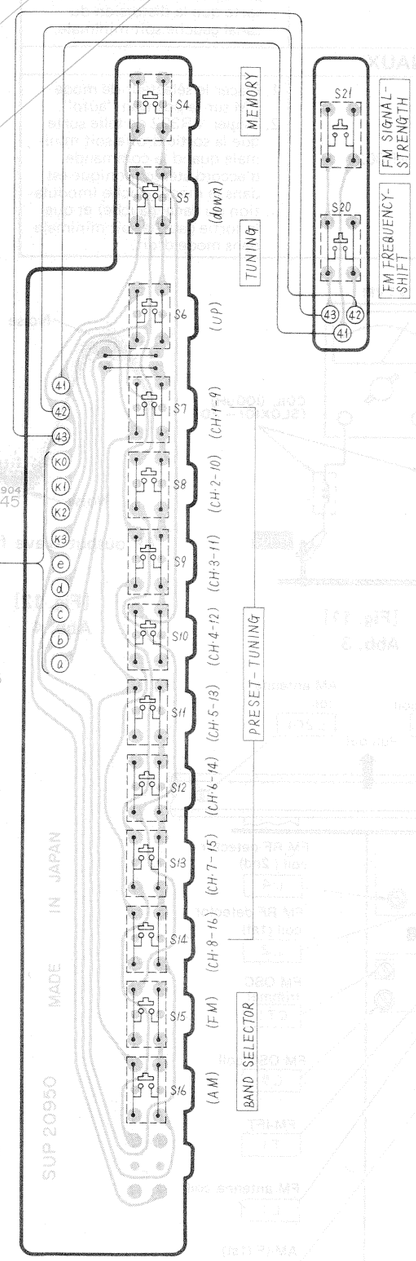
Ground (Earth) lines



Ground (Earth) lines







- Terminal guide of transistors, diodes and IC's

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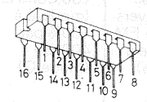	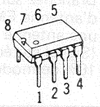
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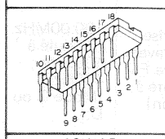	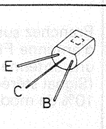
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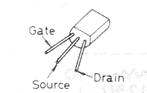	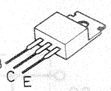
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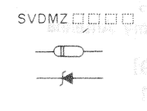
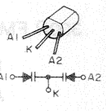
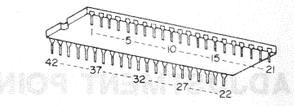
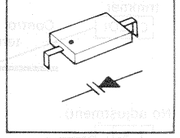
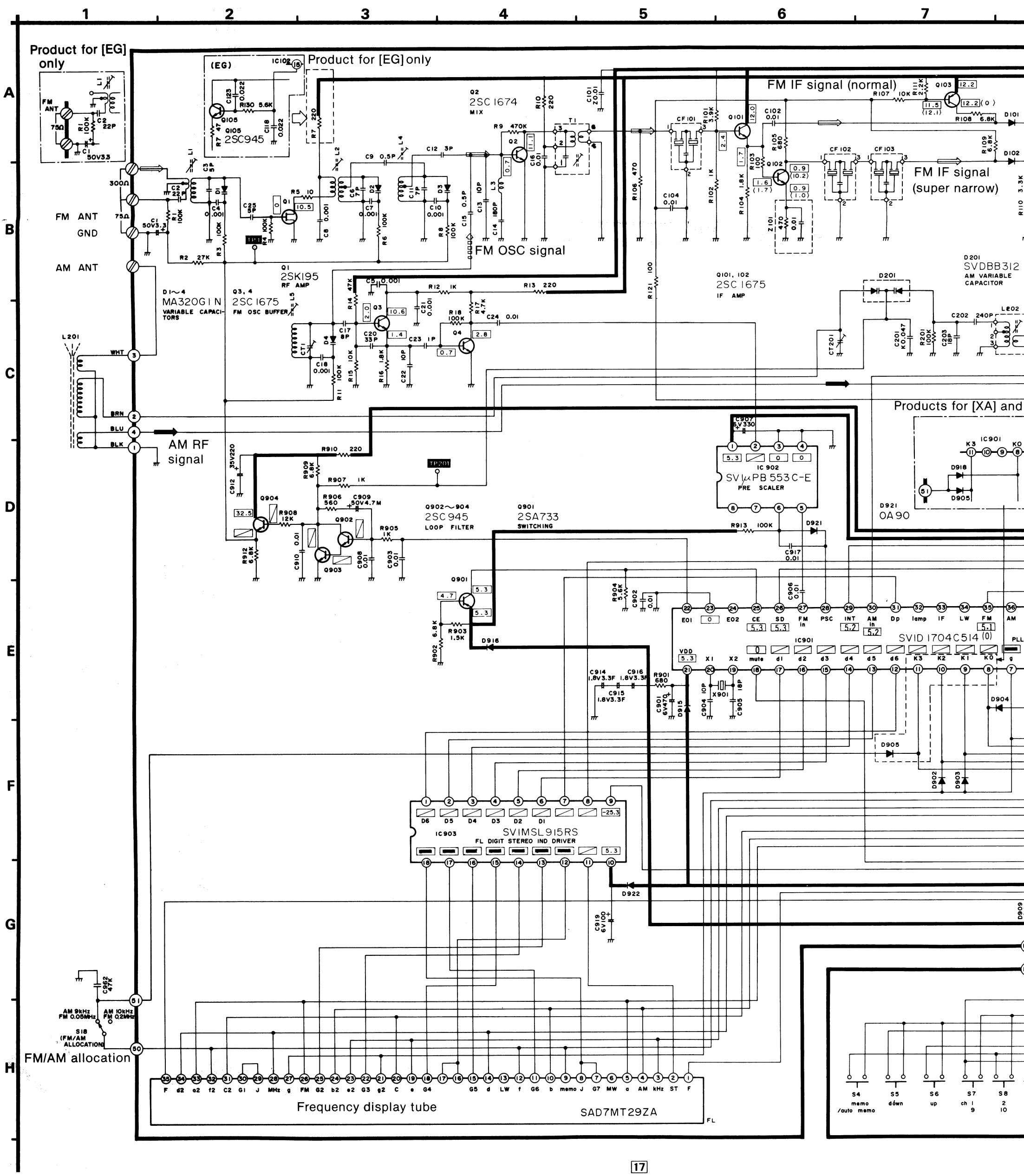
SVDMZ□□□□ 	
SVIDI704C5I4 	
MA320GIN 	

■ SCHEMATIC DIAGRAM (This schematic diagram may be modified at any time with the development of new technology.)

Notes:

1. **S1 :** Power switch in **"on"** position.
2. **S2 :** FM IF band switch in **"normal"** p
3. **S3 :** FM mode switch in **"auto"** positi
4. **S4 :** Memory switch
5. **S5, 6 :** Tuning switch
   [S5 —— down]
   [S6 —— up]
6. **S7 ~ 14 :** Preset-tuning switch
   [S7 —— 1ch, 9ch, S8 —
   [S10 —— 4ch, 12ch, S11 —
   [S13 —— 7ch, 15ch, S14 —
7. **S15, 16 :** Band selector switch
   [S15 —— FM]
   [S16 —— AM]



"on" position.
ch in "normal" position. normal ⟷ super narrow
in "auto" position. auto ⟷ mono

]

itch
9ch, S8 —— 2ch, 10ch, S9 —— 3ch, 11ch,
12ch, S11 —— 5ch, 13ch, S12 —— 6ch, 14ch,
15ch, S14 —— 8ch, 16ch
witch
]

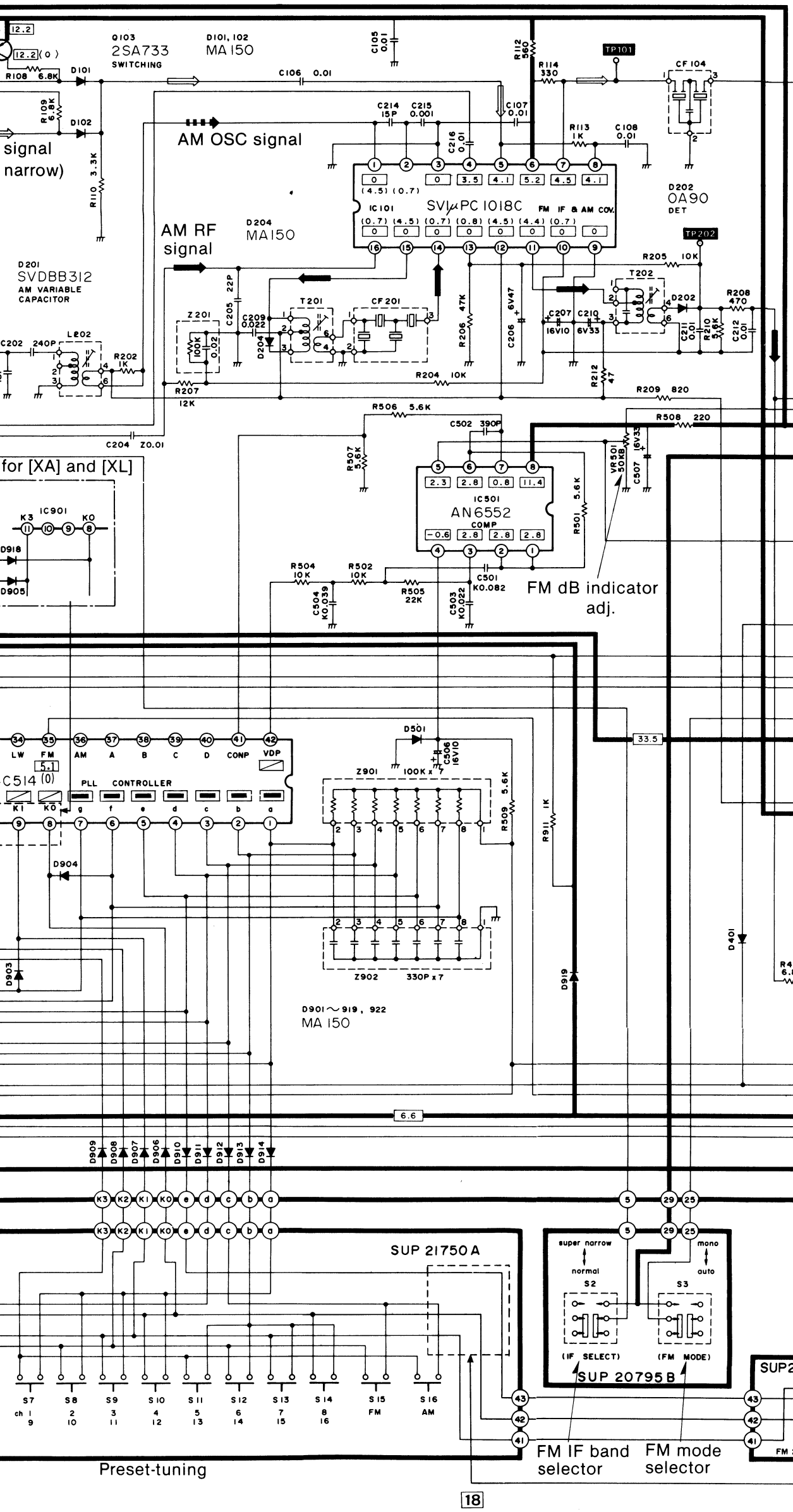
8. **S17 or 21** : FM signal-[illegible]igth indicator switch.
9. **S18** : Allocation [illegible]ector switch in "**AM 9kHz/FM 0.05MHz step**" position.
AM 9kHz/FM 0.05MHz ⟷ AM 10kHz/FM 0.2MHz
10. **S19** : Voltage selector switch in "**240V**" position.
① 110V ⟷ ② 120V ⟷ ③ 220V ⟷ ④ 240V
11. **S20** : FM frequency-shift switch
12. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
* Figures in ▭ stand for DC voltage in FM/AM signal reception mode.
* Figures in ⟨ ⟩ stand for DC voltage in FM stereo signal reception mode.
* Figures in ⌜ ⌟ stand for DC voltage in FM (no signal) muting to on mode.
* Figures in ( ) stand for DC voltage with the band selectors circuit set at AM.

* ▨ marked terminal : 5V or 0V output
* ▬ marked terminal : 5V or −26V output.

13. Signal lines
⇨ FM signal
Audio frequency signal ⇢/➡ AM signal
Positive voltage lines
14. Important safety notice:
Components identified by ⚠ mark have special characteristics important f
When replacing any of these components, use only manufacturer's specifie

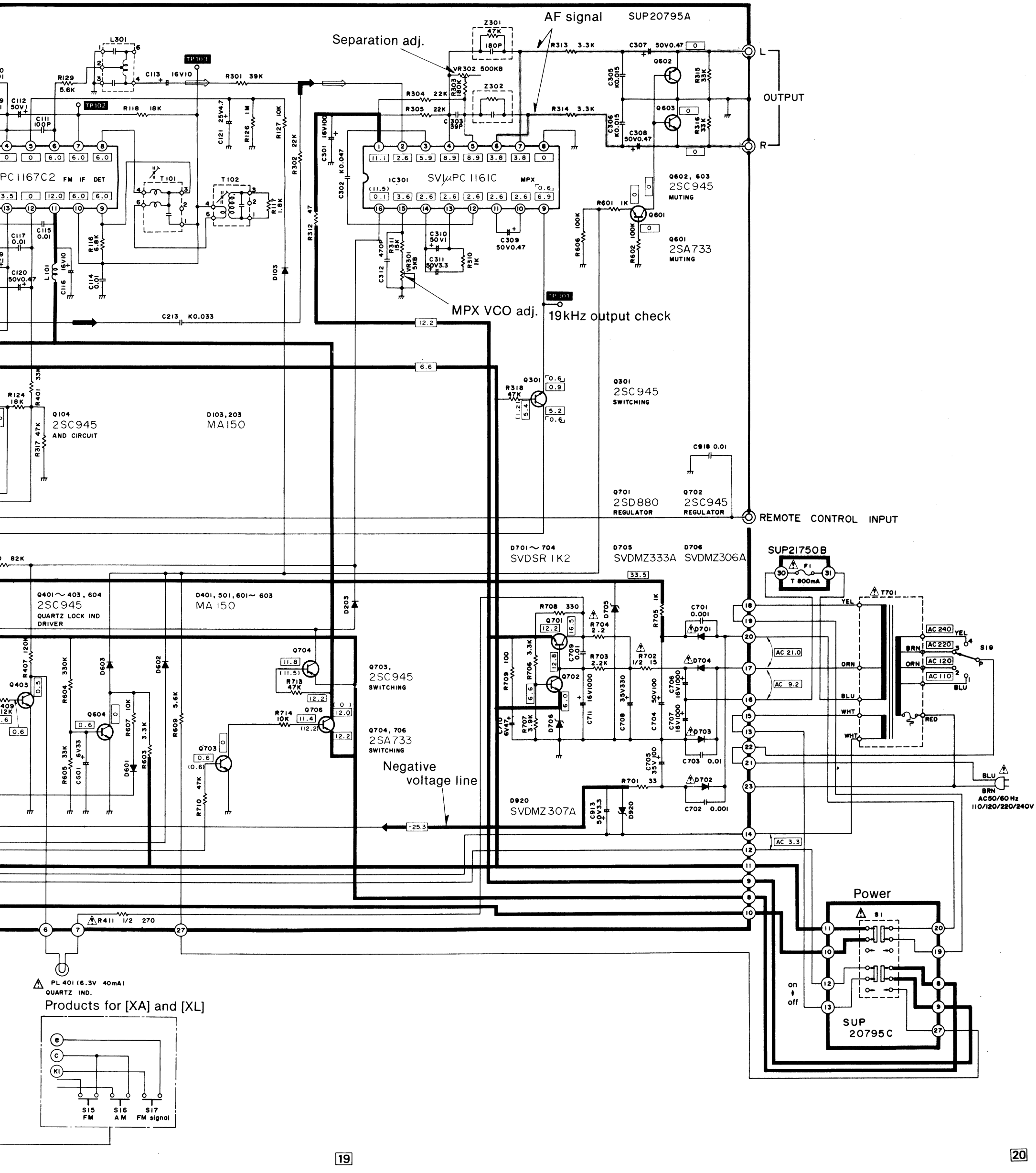
8 9 10 11 12 13 14

Separ



*[/] marked terminal : 5V or 0V output
*[-] marked terminal : 5V or −26V output.

13. Signal lines
    - ⇨ FM signal
    - Audio frequency signal ⇢/➡ AM signal
    - ▬ Positive voltage lines
14. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety.
    When replacing any of these components, use only manufacturer's specified parts.



■ REPLACEMENT PARTS LIST.....Electric Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Areas

* [E] is available in Switzerland and Scandinavia.
* [EG] is available in F.R. Germany.
* [EH] is available in Holland .
* [EA] is available in Austria.
* [XA] is available in East South Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUITS			
IC101		RVIUPC1018CF	IC, FM IF/AM RF Amplifier and AM Converter
IC102		SVIUPC1167C2	IC, FM IF Detector
IC301		SVIUPC1161C	IC, FM Multiplex
IC501		AN6552F	IC, Operation Amplifier
IC901		SVID1704C514	IC, Micro-Computer
IC902		SVIUPB553C–E	IC, Pre-Scaler
IC903		SVIMSL915RS	IC, FL Driver
TRANSISTORS			
Q1		2SK195–H1	Transistor, FM RF Amplifier
Q2		**2SC1674–M**	Transistor, FM Mixer
Q3, 4, 101, 102		**2SC1675–L**	Transistor, FM Oscillator and Buffer IF Amplifier
Q103, 601, 704 706, 901		**2SA733–P1**	Transistor, Switching and Muting
Q104, 301, 401 ~ 403 602 ~ 604, 702 703, 902 ~ 904		**2SC945–Q**	Transistor, Switching, Quartz Lock IND and Loop Filter
Q105 [EG] only		**2SC945–Q**	Transistor, Buffer
Q701		2SD880–Y	Transistor, Regulator
DIODES			
D1 ~ 4		MA320G1–N	Diode, Variable Capacitor (for FM)
D101 ~ 103, 203 204, 401, 501 601 ~ 603, 903 905 ~ 916, 919 922		**MA162A**	Diode, Switching
D201		SVDBB312E	Diode, Variable Capacitor (for AM)
D202, 921		**20A90**	Diode, Switching
D701 ~ 704	⚠	**SVDSR1K2**	Rectifier
D705		SVDMZ333A	Didoe, 33V Zener
D706		SVDMZ306A	Diode, 6V Zener
D901, 902		**MA162A**	Diode, Switching
D904 [E, EG, EH, EA] only		**MA162A**	Diode, Switching
D918 [XA, XL] only		**MA162A**	Diode, Switching
D920		SVDMZ307A	Diode, 7V Zener

Ref. No.		Part No.	Part Name & Description
R401		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ± 5%
R403, 404		**ERD25FJ682**	Carbon, 1/4W, 6.8kΩ, ± 5%
R405		**ERD25TJ273**	Carbon, 1/4W, 27kΩ, ± 5%
R407		**ERD25TJ124**	Carbon, 1/4W, 120kΩ, ± 5%
R408		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R409		**ERD25TJ123**	Carbon, 1/4W, 12kΩ, ± 5%
R411	⚠	**ERD50FJ271**	Carbon, 1/2W, 270Ω, ± 5%
R412		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R501		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R502		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R504		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R505		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R506, 507		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R508		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R509		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R601		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R602		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R603		**ERD25FJ332**	Carbon, 1/4W, 3.3kΩ, ± 5%
R604		**ERD25TJ334**	Carbon, 1/4W, 330kΩ, ± 5%
R605		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ± 5%
R606		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R607		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R609		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R701	⚠	**ERD25FJ330**	Carbon, 1/4W, 33Ω, ± 5%
R702	⚠	ERQ12HJ150	Fuse Type Metallic, 1/2W, 15Ω, ± 5%
R703		**ERD25FJ222**	Carbon, 1/4W, 2.2kΩ, ± 5%
R704	⚠	**ERD25FJ2R2**	Carbon, 1/4W, 2.2Ω, ± 5%
R705	⚠	**ERD50FJ102**	Carbon, 1/2W, 1kΩ, ± 5%
R706		**ERD25FJ332**	Carbon, 1/4W, 3.3kΩ, ± 5%
R707		**ERD25FJ392**	Carbon, 1/4W, 3.9kΩ, ± 5%
R708		**ERD25FJ331**	Carbon, 1/4W, 330Ω, ± 5%
R709		**ERD25FJ101**	Carbon, 1/4W, 100Ω, ± 5%
R710		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ± 5%
R713		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ± 5%
R714		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R901		**ERD25FJ681**	Carbon, 1/4W, 680Ω, ± 5%
R902		**ERD25FJ682**	Carbon, 1/4W, 6.8kΩ, ± 5%
R903		**ERD25FJ152**	Carbon, 1/4W, 1.5kΩ, ± 5%
R904		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R905		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R906		**ERD25FJ561**	Carbon, 1/4W, 560Ω, ± 5%
R907		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R908		**ERD25TJ123**	Carbon, 1/4W, 12kΩ, ± 5%
R909		**ERD25FJ682**	Carbon 1/4W, 6.8kΩ, ± 5%
R910		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R911		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R912		**ERD25FJ682**	Carbon, 1/4W, 6.8kΩ, ± 5%
R913		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
CAPACITORS			
C1		**ECEA50Z3R3**	Electrolytic, 50V, 3.3μF,
C2		ECCD1H220K	Ceramic, 50V, 22pF, ± 10%
C3		ECCD1H050C	Ceramic, 50V, 5pF, ±0.25pF
C4		ECKD1H102ZF	Ceramic, 50V, 0.001μF, +80% −20%
C5		ECKD1H102MD	Ceramic, 50V, 0.001μF, ± 10%
C6		ECCD1H070DC	Ceramic, 50V, 7pF, ± 0.5pF
C7, 8		ECKD1H102ZF	Ceramic, 50V, 0.001μF, +80% −20%
C9		ECCD1H0R5CC	Ceramic, 50V, 0.5pF, ±0.25pF
C10		ECKD1H102ZF	Ceramic, 50V, 0.001μF, +80% −20%
C11		ECCD1H070DC	Ceramic, 50V, 7pF, ± 0.5pF
C12		ECCD1H030C	Ceramic, 50V, 3pF, ±0.25pF
C13		ECCD1H100K	Ceramic, 50V, 10pF, ± 10%
C14		ECCD1H181K	Ceramic, 50V, 180pF, ± 10%
C15		ECCD1H0R5CC	Ceramic, 50V, 0.5pF, ±0.25pF
C16		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C17		ECCD1H080DC	Ceramic, 50V, 8pF, ± 0.5pF
C18		ECKD1H102ZF	Ceramic, 50V, 0.001μF, +80% −20%
C20		ECCD1H330KC	Ceramic, 50V, 33pF, ± 10%
C21		ECKD1H102ZF	Ceramic, 50V, 0.001μF, +80% −20%
C22		ECCD1H100KC	Ceramic, 50V, 10pF, ± 10%
C23		ECCD1H010CC	Ceramic, 50V, 1pF, ±0.25pF
C24		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C25		ECCD1H050C	Ceramic, 50V, 5pF, ±0.25pF
C101, 102		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C103, 104		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C105, 106		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C107, 108		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C109, 110		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C111		ECCD1H101K	Ceramic, 50V, 100pF, ± 10%
C112		**ECEA50Z1**	Electrolytic, 50V, 1μF,
C113		**ECEA1HS100**	Electrolytic, 50V 10μF,
C114, 115		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C116		**ECEA1HS100**	Electrolytic, 50V, 10μF,
C117		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C118		ECKD1H223ZF	Ceramic, 50V, 0.022μF, +80% −20%
C119		**ECEA50Z1**	Electrolytic, 50V, 1μF,
C120		**ECEA50ZR47**	Electrolytic, 50V, 0.47μF,
C121		**ECEA25Z4R7**	Electrolytic, 25V, 4.7μF,
C122		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C123		ECKD1H223ZF	Ceramic, 50V, 0.022μF, +80% −20%
C201		ECQM1H473KZ	Polyester, 50V, 0.047μF, ± 10%
C202		ECQP1471JZ	Polypropylene, 100V, 470pF, ± 5%
C203		ECCD1H180KC	Ceramic, 50V, 18pF, ± 10%
C204		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C205		ECCD1H220K	Ceramic, 50V, 22pF, ± 10%
C206		**ECEA1AS470**	Electrolytic, 10V, 47μF,
C207		**ECEA1HS100**	Electrolytic, 50V, 10μF,
C209		ECKD1H223ZF	Ceramic, 50V, 0.022μF, +80% −20%
C210		**ECEA1CS330**	Electrolytic, 16V, 33μF,
C211, 212		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C213		ECQM1H333KZ	Polyester, 50V, 0.033μF, ± 10%
C214		ECCD1H150KC	Ceramic, 50V, 15pF, ± 10%
C215		ECKD1H102ZF	Ceramic, 50V, 0.001μF, +80% −20%
C216		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C301		**ECEA1ES101**	Electrolytic, 25V 100μF,
C302		ECQM1H473KZ	Polyester, 50V, 0.047μF, ± 10%
C303		ECCD1H390K	Ceramic, 50V, 39pF, ± 10%
C305, 306		ECQM1H153KZ	Polyester, 50V, 0.015μF, ± 10%
C307, 308		**ECEA50ZR47**	Electrolytic, 50V 0.47μF,
C309		**ECEA50ZR47**	Electrolytic, 50V 0.47μF,
C310		**ECEA50Z1**	Electrolytic, 50V 1μF,
C311		**ECEA50Z3R3**	Electrolytic, 50V, 3.3μF,
C312		ECQP1471JZ	Polypropylene, 100V, 470pF, ± 5%
C401		**ECEA1HS100**	Electrolytic, 50V 10μF,
C501		ECQM1H823KZ	Polyester, 50V, 0.082μF, ± 10%
C502		ECKD1H391KB	Ceramic, 50V, 390pF, ± 10%
C503		ECQM1H223KZ	Polyester, 50V, 0.022μF, ± 10%
C504		ECQM1H393KZ	Polyester, 50V, 0.039μF, ± 10%
C506		**ECEA1HS100**	Electrolytic, 50V 10μF,
C507		**ECEA1CS330**	Electrolytic, 16V 33μF,
C601		**ECEA1CS330**	Electrolytic, 16V 33μF,
C701, 702		ECKD2H102KB	Ceramic, 500V, 0.001μF, ± 10%
C703		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C704		**ECEA1HS101**	Electrolytic, 50V, 100μF,
C705		**ECEA1VS101**	Electrolytic, 35V 100μF,
C706, 707		**ECEA1CS102**	Electrolytic, 16V, 1000μF,
C708		**ECEA1VS331**	Electrolytic, 35V 330μF,
C709		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C710		**ECEA1AS470**	Electrolytic, 10V, 47μF,
C711		**ECEA1CS102**	Electrolytic, 16V, 1000μF,
C901		**ECEA0JS471**	Electrolytic, 6.3V, 470μF,
C902, 903		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C904		ECCD1H100KC	Ceramic, 50V, 10pF, ± 10%
C905		ECCD1H180KC	Ceramic, 50V, 18pF, ± 10%
C906		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C907		**ECEA1AS331**	Electrolytic, 10V 330μF,
C908		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C909		**ECEA50M4R7R**	Electrolytic, 50V, 4.7μF,
C910		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C912		**ECEA1VS221**	Electrolytic, 35V, 220μF,
C913		**ECEA50Z3R3**	Electrolytic, 50V, 3.3μF
C914, 915		EECW1R8A3R3S	Electrolytic, 1.8V, 3.3F
C916		EECW1R8A3R3S	Electrolytic, 1.8V, 3.3F
C917		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C918		ECKD1H103ZF	Ceramic, 50V, 0.01μF, +80% −20%
C919		**ECEA1AS101**	Electrolytic, 10V, 100μF,
C962		ECCD1H470K	Ceramic, 50V, 47pF, ± 10%

■ REPLACEMENT PARTS LIST.....Cabine

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
3. ■ -marked parts are used for black only, while ○-marked parts are for silver type only.

Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1	○	SGWTS4E	Front Panel Ass'y
1 [XA, XL] only	○	SGWTS4E1	Front Panel Ass'y
1	■	SGWTS4KE	Front Panel Ass'y (Black)
1 [XA, XL] only	■	SGWTS4KE1	Front Panel Ass'y (Black)
1–1		SHG6063–1	Spacer, Front Panel
1–2		SBC341	Button, FM/AM Preset Tuning Switch
1–3		SBC343	Button, Tuning Switch
1–4		SHR9543	Holder, Button
1–5 [E, EG, EH, EA] only		SBC343	Button, FM Signal and Frequency Shift Switch
1–6 [E, EG, EH, EA] only		SHS3229–2	Speacer, Holder
1–7 [E, EG, EH, EA] only		SHR9541	Holder, Button
2 [E, EG, EH, EA] only		SGX7057	Button Ornament
3 [E, EG, EH EA] only		SGX7007	Button, Ornament
4	○	SGX7003–1	Ornament, Left and Right Side
4	■	SGX7003	Ornament, Left and Right Side (Black)
5		SBC341	Button, FM IF Band and Mode Switch
6	○	SGXTS4E	Front Sub Panel
6 [XA, XL] only	○	SGXTS4N	Front Sub Panel
6	■	SGXTS4KE	Front Sub Panel
6 [XA, XL] only	■	SGXTS4KE1	Front Sub Panel
7		SUS231–1	Spring, Button
8		SBZ601	Holder, Button
9 [E, EG, EH EA] only		SHR5119	Speace, Button
10		SBC337	Button, Power Source Switch
11		SHR5113	Filter, FL
12		SHG1383–1	Holder, Lamp (Quartz Lock)
13	○	SKC690S	Cabinet Cover
13	■	SKC690B	Cabinet Cover (Black)
14		SJT347	Holder, Fuse
15		SMN1635	Bracket, Voltage Adjustment Switch
16 [XL] only		SUV473	Cover, Voltage Adjustment Switch
17		SHG647	Rubber, Power Source Transformer
18		SJF3207–5N	Terminal Board, Output
19		SJF3107–1N	Terminal Board, Control Input
20 [E] only		SGPTS4E	Rear Panel
20 [EG] only		SGPTS4E1	Rear Panel
20 [EH, EA] only		SGPTS4E2	Rear Panel
20 [XA, XL] only		SGPTS4E3	Rear Panel
21		SHR127	Bushing, AC Cord
22	⚠	**SJA88**	AC Cord
22 [XL] only	⚠	**QFC1208M**	AC Cord
23		SJF4419–4	Terminal Board, Antenna
23 [EG] only		SJF4311–4	Terminal Board, Antenna
24		SHR5073–1	Cover, Allocation Switch
25		SKL227	Foot

Areas

* [E] is available in Switzerland and Scandinavia.
* [EG] is available in F.R. Germany.
* [EH] is available in Holland .
* [EA] is available in Austria.
* [XA] is available in East South Asia, Oceania, Africa, Middle Near East and Central South America.
* [XL] is available in Australia.

		Part No.	Part Name & Description
		2SC1675–L	Transistor, FM Oscillator and Buffer IF Amplifier
		2SA733–P1	Transistor, Switching and Muting
		2SC945–Q	Transistor, Switching, Quartz Lock IND and Loop Filter
		2SC945–Q	Transistor, Buffer
		2SD880–Y	Transistor, Regulator
		MA320G1–N	Diode, Variable Capacitor (for FM)
		MA162A	Diode, Switching
		SVDBB312E	Diode, Variable Capacitor (for AM)
		20A90	Diode, Switching
	Δ	**SVDSR1K2**	Rectifier
		SVDMZ333A	Didoe, 33V Zener
		SVDMZ306A	Diode, 6V Zener
		MA162A	Diode, Switching
		MA162A	Diode, Switching
		MA162A	Diode, Switching
		SVDMZ307A	Diode, 7V Zener

Ref. No.		Part No.	Part Name & Description
CRYSTAL			
X901		SVQ43U452	Crystal, 4.5MHz Counter Oscillator
FLUORESCENT DISPLAY TUBE			
FL		SAD7MT29ZA	Flurescent Display Tube
VARIABLE RESISTORS			
VR301		**EVTS3MA00B53**	VCO Adjustment, 5kΩ (B)
VR302		**EVTS3MA00B55**	Separation Adjustment, 500kΩ (B)
VR501		**EVTS3MA00B54**	FM Signal Strength Level Adjustment 50kΩ, (B)
VARIABLE CAPACITORS			
CT1		SVCTY121B269	Trimmer, FM Local Oscillator
CT201		SVCTY122D221	Trimmer, AM Antenna
COMPONENT COMBINATIONS			
Z101		EXRP103P471T	Component Combination, 0.01μF, 470Ω
Z201		EXRP203Z104T	Component Combination, 0.02μF, 100kΩ
Z301, 302		EXRP181K473T	Component Combination, 180pF, 470kΩ
Z901		EXBP87104K	Component Combination, 100kΩ (x 7)
Z902		EXFP7331MW	Component Combination, 330pF, (x 7)

Ref. No.		Part No.	Part Name & Description
COILS and TRANSFORMERS			
L1		SLA4P55–P	Coil, FM Antenna
L2		SLD4P53–P	Coil, FM Detector
L3		RLQY15G5–Y	Coil, Choke
L4		SLD4P43	Coil, FM Detector
L5		SLO4N21	Coil, FM Local Oscillator
L101		SLQX101–3M	Coil, Choke
L201		SLF2C33–1	Coil, AM Bar Antenna
L202		SLO2C29–P	Coil, AM Local Oscillator
L301		SLM1C61–P	Coil
T1		SLI4C109	Transformer, FM IF
T101		SLI4C529–Z	Transformer, FM Discriminator
T102		SLI4C531–Z	Transformer, FM Discriminator
T201		SLI2C127	Transformer, AM IF
T202		SLI2C413R	Transformer, AM IF
T701	Δ	SLT5J121–1W	Transformer, Power Source
T701 [XL] only	Δ	SLT5J145–W	Transformer, Power Source
CERAMIC FILTERS			
CF101, 104		SVFE107MM–A	Ceramic Filter, FM 10.7MHz Red
		SVFE107MM–D	Ceramic Filter, FM 10.65MHz Brown
CF102, 103		SVFE107MZ2–A	Ceramic Filter, FM 10.7MHz Red
		SVFE107MZ2–D	Ceramic Filter, FM 10.65MHz Brown (Use pair ranks as same as CF101, CF102 CF103 and CF104)
CF201		SVFSFP450HT	Ceramic Filter, AM 450kHz

Ref. No.		Pa
LAMP		
PL 401	Δ	XAM
FUSE		
F1	Δ	XBA
SWITCHES		
S1	Δ	SSH
S2, 3		SSH
S4 ~ 16		SSG
S17 [XA, XL] only		SSG
S18		ESD
S19	Δ	ESE
S20, 21 [E, EG, EH, EA] only		SSG
LIQUID ELECTROLYTE		
C914 ~ 916		EECW
RESISTORS		
R1		ERD
R2		ERD
R3, 4		ERD

EPLACEMENT PARTS LIST.....Cabinet and Chassis Parts

es: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice:
Components identified by Δ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
3. [K] -marked parts are used for black only, while ○-marked parts are for silver type only.
4. Parts other than [K] -and ○-marked are used for both black and silver types.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

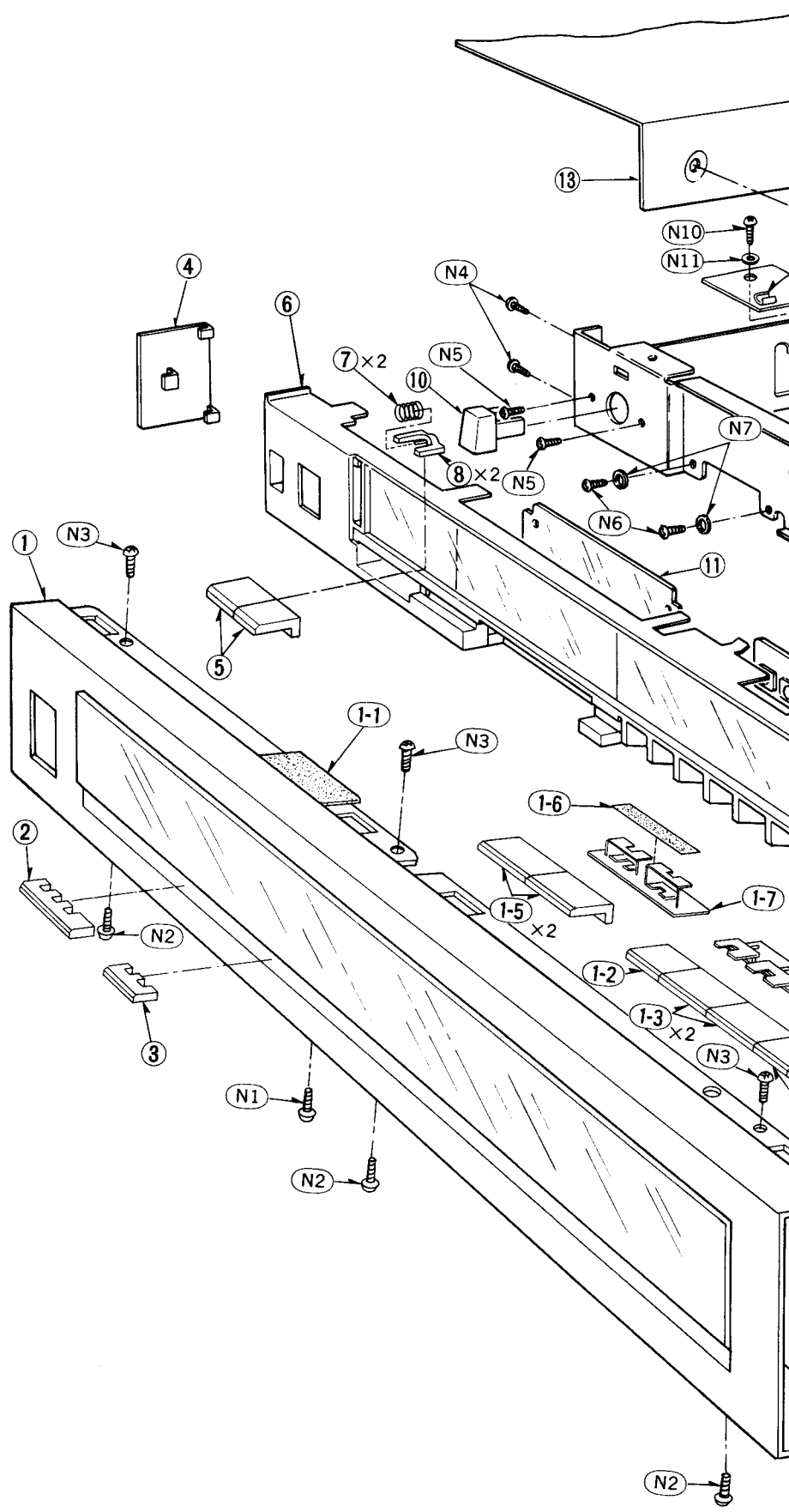
Black type model No.: ST-S4(K)

		Part No.	Part Name & Description
d CHASSIS PARTS			
	○	SGWTS4E	Front Panel Ass'y
	○	SGWTS4E1	Front Panel Ass'y
	[K]	SGWTS4KE	Front Panel Ass'y (Black)
	[K]	SGWTS4KE1	Front Panel Ass'y (Black)
		SHG6063–1	Spacer, Front Panel
		SBC341	Button, FM/AM Preset Tuning Switch
		SBC343	Button, Tuning Switch
		SHR9543	Holder, Button
		SBC343	Button, FM Signal and Frequency Shift Switch
		SHS3229–2	Speacer, Holder
		SHR9541	Holder, Button
		SGX7057	Button Ornament
		SGX7007	Button, Ornament
	○	SGX7003–1	Ornament, Left and Right Side
	[K]	SGX7003	Ornament, Left and Right Side (Black)
		SBC341	Button, FM IF Band and Mode Switch
	○	SGXTS4E	Front Sub Panel
	○	SGXTS4N	Front Sub Panel
	[K]	SGXTS4KE	Front Sub Panel
	[K]	SGXTS4KE1	Front Sub Panel
		SUS231–1	Spring, Button
		SBZ601	Holder, Button
		SHR5119	Speace, Button
		SBC337	Button, Power Source Switch
		SHR5113	Filter, FL
		SHG1383–1	Holder, Lamp (Quartz Lock)
	○	SKC690S	Cabinet Cover
	[K]	SKC690B	Cabinet Cover (Black)
		SJT347	Holder, Fuse
		SMN1635	Bracket, Voltage Adjustment Switch
		SUV473	Cover, Voltage Adjustment Switch
		SHG647	Rubber, Power Source Transformer
		SJF3207–5N	Terminal Board, Output
		SJF3107–1N	Terminal Board, Control Input
		SGPTS4E	Rear Panel
		SGPTS4E1	Rear Panel
		SGPTS4E2	Rear Panel
		SGPTS4E3	Rear Panel
		SHR127	Bushing, AC Cord
	Δ	**SJA88**	AC Cord
	Δ	**QFC1208M**	AC Cord
		SJF4419–4	Terminal Board, Antenna
		SJF4311–4	Terminal Board, Antenna
		SHR5073–1	Cover, Allocation Switch
		SKL227	Foot

Ref. No.		Part No.	Part Name & Description
SCREWS and WASHERS			
N1 [except XA,XL]	○	**XSS3+8BNS**	Screw, ⊕ 3 x 8
N1 [except XA,XL]	[K]	**XSS3+8BVS**	Screw, ⊕ 3 x 8 (Black)
N2		**XTB3+8BFZ**	Screw, Tapping ⊕ 3 x 8
N3		**XTS3+8BFZ**	Screw, Tapping ⊕ 3 x 8
N4		**XTS3+8B**	Screw, Tapping ⊕ 3 x 8
N5		**XSS3+6S**	Screw, ⊕ 3 x 6
N6		**XSN3+6S**	Screw, ⊕ 3 x 6
N7		**XWA3B**	Washer, Spring, φ3
N8		**XTB3+8BFZ**	Screw, Tapping ⊕ 3 x 8
N9	○	**XTB4+8BFN**	Screw, Tapping ⊕ 4 x 8
N9	[K]	**XTB4+8BFZ**	Screw, Tapping ⊕ 4 x 8 (Black)
N10		**XTN3+8B**	Screw, Tapping ⊕ 3 x 8
N11		**XWG3**	Washer, Plain, φ3
N12		XTB3+14BFZ	Screw, Tapping ⊕ 3 x 14
N13		XTBS3+8BFZ1	Screw, Tapping With Detent ⊕3 x 8
N14		**XTB3+10BFZ**	Screw, Tapping ⊕ 3 x 10
N15		**XWA3B**	Washer, Spring, φ3
N16		**XSN3+6BVS**	Screw, ⊕ 3 x 6
N17		**XTB3+10BFZ**	Screw, Tapping ⊕ 3 x 10
ACCESSORIES			
A1		SSA267	Cord, FM Indoor Antenna
A2		SJP2129–5	Cord, Stereo Pin-Type Connection
A3 [XA] only	Δ	SJP5213–1	Plug, AC Power Adaptor
A4		SQF10879	Instructions Book, Printed Matter
A4 [XA, XL] only		SQF10859	Instructions Book, Printed Matter
A4 [EG] only		SQF10729	Instructions Book, Printed Matter
PACKING PARTS			
P1		SPP647	Polyethylene Bag
P2		SPS3029	Pad, Front Side
P2 [XL] only		SPS3029–2	Pad, Front Side
P3		SPS3031–4	Pad, Rear Side
P3 [XL] only		SPS3031–3	Pad, Rear Side
P4	○	SPG3035	Carton Box
P4 [XL] only	○	SPG3039	Carton Box
P4 [EG] only	[K]	SPG3041	Carton Box
P4	[K]	SPG3043	Carton Box
P4 [XL] only	[K]	SPG3045	Carton Box

ilable in Switzerland and Scandinavia.
vailable in F.R. Germany.
vailable in Holland .
vailable in Austria.
vailable in East South Asia, Oceania, Africa,
ear East and Central South America.
vailable in Australia.

■ EXPLODED VIEWS



Ref. No.		Part No.	Part Name & Description
LAMP			
PL 401	⚠	XAMR38S200B	Lamp, Quartz Lock 40mA (6.3V)
FUSE			
F1	⚠	XBA2C08TR0	Fuse, T800mA (250V)
SWITCHES			
S1	⚠	SSH183	Switch, Power Source
S2, 3		SSH2007	Switch, FM IF Selector, FM Mode
S4 ~ 16		SSG7	Switch, Memory, Tuning Preset, Mode
S17 [XA, XL] only		SSG7	Switch, FM Signal Strength
S18		ESD14116	Switch, AM Allocation Selection
S19	⚠	ESE372	Switch, Voltage Adjustment
S20, 21 [E, EG, EH, EA] only		SSG7	Switch, FM 25kHz Sift, FM Signal Strength
LIQUID ELECTROLYTE DOUDIE LAYER CAPACITOR			
C914 ~ 916		EECW1R8A3R3S	Liquid Electrolyte Double Layer 1.8V, 3.3F
RESISTORS			
R1		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R2		**ERD25TJ273**	Carbon, 1/4W, 27kΩ, ± 5%
R3, 4		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%

Ref. No.		Part No.	Part Name & Description
R5		**ERD25FJ100**	Carbon, 1/4W, 10Ω, ± 5%
R6		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R7		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R7 [EG] only		**ERD25FJ470**	Carbon, 1/4W, 47Ω, ± 5%
R8		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R9		**ERD25TJ474**	Carbon, 1/4W, 470kΩ, ± 5%
R10		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R11		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R12		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R13		**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%
R14		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ± 5%
R15		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R16		**ERD25FJ182**	Carbon, 1/4W, 1.8kΩ, ± 5%
R17		**ERD25FJ472**	Carbon, 1/4W, 4.7kΩ, ± 5%
R18		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R101		**ERD25FJ392**	Carbon, 1/4W, 3.9kΩ, ± 5%
R102		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R103		**ERD25FJ101**	Carbon, 1/4W, 100Ω, ± 5%
R104		**ERD25FJ182**	Carbon, 1/4W, 1.8kΩ, ± 5%
R105		**ERD25FJ681**	Carbon, 1/4W, 680Ω, ± 5%
R106		**ERD25FJ471**	Carbon, 1/4W, 470Ω, ± 5%
R107		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R108, 109		**ERD25FJ682**	Carbon, 1/4W, 6.8kΩ, ± 5%
R110		**ERD25FJ332**	Carbon, 1/4W, 3.3kΩ, ± 5%
R111		**ERD25FJ222**	Carbon, 1/4W, 2.2kΩ, ± 5%
R112		**ERD25FJ561**	Carbon, 1/4W, 560Ω, ± 5%
R113		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R114, 115		**ERD25FJ331**	Carbon, 1/4W, 330Ω, ± 5%
R116		**ERD25FJ682**	Carbon, 1/4W, 6.8kΩ, ± 5%
R117		**ERD25FJ182**	Carbon, 1/4W, 1.8kΩ, ± 5%
R118		**ERD25TJ183**	Carbon, 1/4W, 18kΩ, ± 5%

Ref. No.		Part No.	Part Name & Description
R119		**ERD25TJ273**	Carbon, 1/4W, 27kΩ, ± 5%
R120		**ERD25TJ274**	Carbon, 1/4W, 270kΩ, ± 5%
R121		**ERD25FJ101**	Carbon, 1/4W, 100Ω, ± 5%
R122, 123		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ± 5%
R124		**ERD25TJ183**	Carbon, 1/4W, 18kΩ, ± 5%
R125		**ERD25TJ563**	Carbon, 1/4W, 56kΩ, ± 5%
R126		**ERD25TJ105**	Carbon, 1/4W, 1MΩ, ± 5%
R127		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R128		**ERD25TJ274**	Carbon, 1/4W, 270kΩ, ± 5%
R129		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R130 [EG] only		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R201		**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%
R202		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R204, 205		**ERD25FJ103**	Carbon, 1/4W, 10kΩ, ± 5%
R206		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ± 5%
R207		**ERD25TJ123**	Carbon, 1/4W, 12kΩ, ± 5%
R208		**ERD25FJ471**	Carbon, 1/4W, 470Ω, ± 5%
R209		**ERD25FJ821**	Carbon, 1/4W, 820Ω, ± 5%
R210		**ERD25FJ562**	Carbon, 1/4W, 5.6kΩ, ± 5%
R212		**ERD25FJ470**	Carbon, 1/4W, 47Ω, ± 5%
R301		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ± 5%
R302		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R303		**ERD25TJ184**	Carbon, 1/4W, 180kΩ, ± 5%
R304, 305		**ERD25TJ223**	Carbon, 1/4W, 22kΩ, ± 5%
R310		**ERD25FJ102**	Carbon, 1/4W, 1kΩ, ± 5%
R311		**ERD25TJ153**	Carbon, 1/4W, 15kΩ, ± 5%
R312	⚠	**ERD50FJ470**	Carbon, 1/2W, 47Ω, ± 5%
R313, 314		**ERD25FJ332**	Carbon, 1/4W, 3.3kΩ, ± 5%
R315, 316		**ERD25TJ333**	Carbon, 1/4W, 33kΩ, ± 5%
R317, 318		**ERD25TJ473**	Carbon, 1/4W, 47kΩ, ± 5%
R320		**ERD25TJ823**	Carbon, 1/4W, 82kΩ, ± 5%

ST-S4 ST-S4

• Accessories

Printed in Japan
81056000 Ⓗ TK/TN

ORDER NO. SD81072004C4

Service Manual

QUARTZ Synthesizer FM/AM Stereo Tuner

ST-S4

[PA], [PE]

Areas

* [PA] is available in far East PX.
* [PE] is available in European Military.

Please use this manual together with the service manual for Model No. ST-S4 (Silver type) Order No. SD81041873C8.

CHANGES

■ REPLACEMENT PARTS LIST

Ref. No.	Change of Part No.		Part Name & Description	Per Set (Pcs.)	Remarks
	ST-S4 (Silver) (ORDER NO. SD81041873C8)	➡ ST-S4 [PA, PE]			
TRANSISTOR					
Q105	**2SC945–Q** [EG] only	Deletion	· ·	0	
DIODES					
D904	**MA162A** [E, EG, EH EA] only	Deletion	· ·	0	
D918	**MA162A** [XA, XL] only	**MA162A**	Diode, Switching	1	
TRANSFORMER					
T701	SLT5J121–1W SLT5J145–W [XL] only	SLT5J121–1W	Transformer, Power Source	1	
SWITCHES					
S17	SSG7 [XA, XL] only	SSG7	Switch, FM Signal Strength	1	
S20, 21	SSG7 [E, EG, EH, EA] only	Deletion	· ·	0	
RESISTORS					
R7	**ERD25FJ221** **ERD25FJ470** [EG] only	**ERD25FJ221**	Carbon, 1/4W, 220Ω, ± 5%	1	
R130	**ERD25FJ562** [EG] only	Deletion	· ·	0	
R313, 314	**ERD25FJ332**	**ERD25FJ272**	Carbon, 1/4W, 2.7kΩ, ± 5%	2	
R315, 316	**ERD25TJ333**	**ERD25TJ104**	Carbon, 1/4W, 100kΩ, ± 5%	2	
CAPACITORS					
C113	**ECEA1HS100**	**ECEA16N10**	Non-Polar Electrolytic, 16V, 10μF	1	
C305, 306	ECQM1H153KZ	ECQM1H273JZ	Polyester, 50V, 0.027μF, ± 5%	2	ARD
CABINET and CHASSIS PARTS					
1	SGWTS4E SGWTS4E1 [XA, XL] only	SGWTS4E1	Front Panel Ass'y	1	
1–5	SBC343 [E, EG, EH, EA] only	Deletion	· ·	0	
1–6	SHS3229–2 [E, EG, EH, EA] only	Deletion	· ·	0	
1–7	SHR9541 [E, EG, EH, EA] only	Deletion	· ·	0	
2	SGX7057 [E, EG, EH, EA] only	Deletion	· ·	0	
3	SGX7007 [E, EG, EH, EA] only	Deletion	· ·	0	
6	SGXTS4E SGXTS4N [XA, XL] only	SGXTS4E	Front Sub Panel	1	

Technics

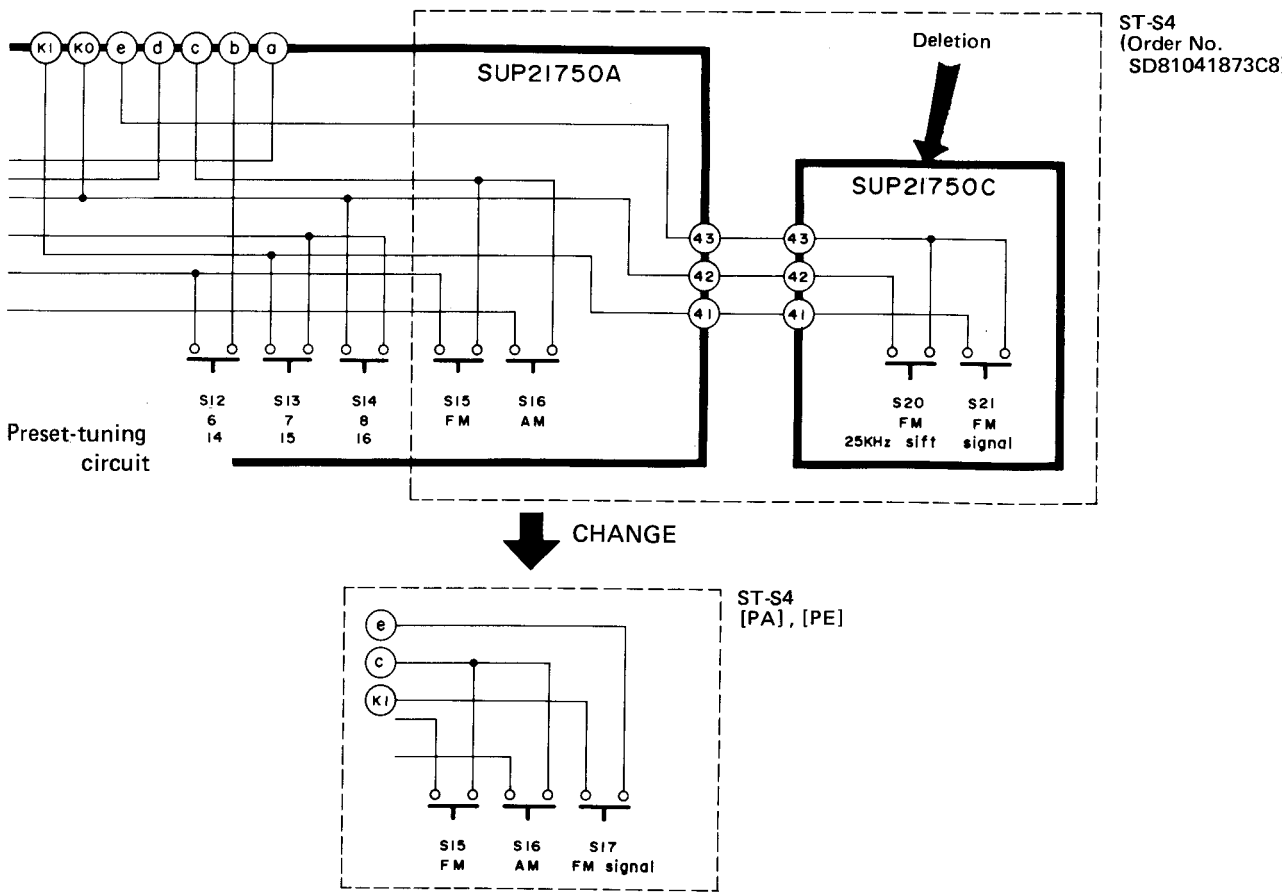
Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shiba-koen, Minato-ku, Tokyo 105 Japan

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

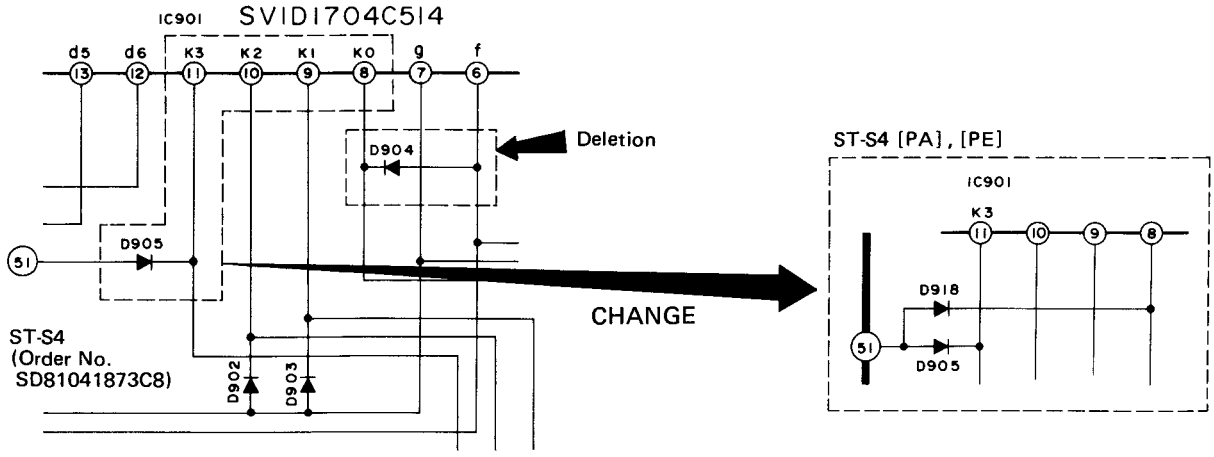
Ref. No.	Change of Part No.		Part Name & Description	Per Set (Pcs.)	Remarks
	ST-S4 (Silver) (ORDER NO. SD81041873C8)	ST-S4 [PA, PE]			
9	SHR5119 [E, EG, EH, EA] only	Deletion	· ·	0	
16	SUV473 [XL] only	Deletion	· ·	0	
20	SGPTS4E [E] only SGPTS4E1 [EG] only SGPTS4E2 [EH, EA] only SGPTS4E3 [XA, XL] only	SGPTS4E4	Rear Panel	1	○
22	**SJA88** **QFC1208M** [XL] only	**RJA52Z**	AC Cord	1	RD
23	SJF4419–4 SJF4311–4 [EG] only	SJF4419–4	Terminal Board, Antenna	1	
ACCESSORIES					
A3	SJP5213–1 [XA] only	RJP120ZBS	Plug, AC Power Adaptor	1	
A4	SQF10879 SQF10859 [XA, XL] only SQF10729 [EG] only	SQF10731	Instructions Book, Printed Matter	1	○
PACKING PARTS					
P2	SPS3029 SPS3029–2 [XL] only	SPS3029	Pad, Front Side	1	
P3	SPS3031–4 SPS3031–3 [XL] only	SPS3031–4	Pad, Rear Side	1	
P4	SPG3035 SPG3039 [XL] only	SPG3035	Carton Box	1	

■ SCHEMATIC DIAGRAM

- **Preset-tuning circuit**



- **Micro-computer circuit**



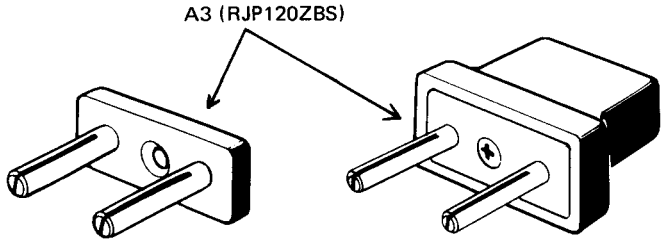
■ REPLACEMENT PARTS LIST.....Cabinet & Chassis Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.

2. Important safety notice:
Components indentified by ⚠ make have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1		SGWTS4E1	Front Panel Ass'y
1–1		SHG6063–1	Spacer, Front Panel
1–2		SBC341	Button, FM/AM Preset Tuning Switch
1–3		SBC343	Button, Tuning Switch
1–4		SHR9543	Holder, Button
4		SGX7003–1	Ornament, Left and Right Side
5		SBC341	Button, FM IF Band and Mode Switch
6		SGXTS4E	Front Sub Panel
7		SUS231–1	Spring, Button
8		SBZ601	Holder, Button
10		SBC337	Button, Power Source Switch
11		SHR5113	Filter, FL
12		SHG1383–1	Holder, Lamp (Quartz Lock)
13		SKC690S	Cabinet Cover
14		SJT347	Holder, Fuse
15		SMN1635	Bracket, Voltage Adjustment Switch
17		SHG647	Rubber, Power Source Transformer
18		SJF3207–5N	Terminal Board, Output
19		SJF3107–1N	Terminal Board, Control Input
20		SGPTS4E4	Rear Panel
21		SHR127	Bushing, AC Cord
22	⚠	**RJA52Z**	AC Cord
23		SJF4419–4	Terminal Board, Antenna
24		SHR5073–1	Cover, Allocation Switch
25		SKL227	Foot
SCREWS and WASHERS			
N1		**XSS3+8BNS**	Screw, ⊕ 3 x 8
N2		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
N3		**XTS3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
N4		**XTS3+8B**	Screw, Tapping, ⊕ 3 x 8
N5		**XSS3+6S**	Screw, ⊕ 3 x 6
N6		**XSN3+6S**	Screw, ⊕ 3 x 6
N7		**XWA3B**	Washer, Spring, ϕ3
N8		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
N9		**XTB4+8BFN**	Screw, Tapping, ⊕ 4 x 8
N10		**XTN3+8B**	Screw, Tapping, ⊕ 3 x 8
N11		**XWG3**	Washer, Plain, ϕ3
N12		XTB3+14BFZ	Screw, Tapping, ⊕ 3 x 14
N13		XTBS3+8BFZ1	Screw, Tapping With Detent, ⊕ 3 x 8
N14		**XTB3+10BFZ**	Screw, Tapping, ⊕ 3 x 10
N15		**XWA3B**	Washer, Spring, ϕ3
N16		**XSN3+6BVS**	Screw, ⊕ 3 x 6
N17		**XTB3+10BFZ**	Screw, Tapping, ⊕ 3 x 10
ACCESSORIES			
A1		SSA267	Cord, FM Indoor Antenna
A2		SJP2129–5	Cord, Stereo Pin-Type Connection
A3	⚠	RJP120ZBS	Plug, AC Power Adaptor
A4		SQF10879	Instructions Book, Printed Matter
PACKING PARTS			
P1		SPP647	Polyethylene Bag
P2		SPS3029	Pad, Front Side
P3		SPS3031–4	Pad, Rear Side
P4		SPG3035	Carton Box

- **Accessory**



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